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Informal Report

**The Application of a Library of
Processed ENDF/B-IV Fission-Product Aggregate
Decay Data in the Calculation of
Decay-Energy Spectra**

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THE APPLICATION OF A LIBRARY OF PROCESSED ENDF/B-IV
FISSION-PRODUCT AGGREGATE DECAY DATA IN THE CALCULATION
OF DECAY-ENERGY SPECTRA

by

R. J. LaBauve, T. R. England, D. C. George, and M. G. Stamatelatos

ABSTRACT

Results from summation calculations by the CINDER-10 code and ENDF/B-IV decay, cross-section, and yield data for fission pulses have been incorporated into an ENDF/B-type format. The organization and content of this basic fine-group source-term library is described. In addition, two codes are described that provide pulse functions as fits to a user-specified multigrouping of the fine-group library. These can be readily used, essentially as Green's functions, to produce the spectra following any specific reactor power history. A particular set of fitted beta and gamma spectra having wide utility is described. Absorption effects are incorporated.

I. INTRODUCTION

The ENDF/B-IV fission-product files contain neutron cross sections, decay constants, decay energies, and other decay data for 824 important fission products. They also contain fission yields for these fission products produced by one or more fission-neutron energies (14 MeV, fast, and thermal fission) of six important nuclides: ^{232}Th , ^{233}U , ^{235}U , ^{238}U , ^{239}Pu , and ^{241}Pu . Also, spectral data (i.e., beta end-point energies and intensities, gamma-line energies and intensities) exist for the most important decay-heat contributors among the 824 nuclides. In ENDF/B-IV, beta-spectral data exist for 163 fission products, and gamma-spectral data exist for 172 nuclides (nuclides emitting both beta and gamma radiation are included separately in both types of radiation counts). The contents of the ENDF/B-IV fission-product file are detailed in Refs. 1-3 and summarized in Table I.

In recent years, great emphasis has been placed on obtaining experimental and computational information on delayed energy release at short cooling times for nuclear reactor safety studies of the hypothetical loss-of-coolant-accident (LOCA). There is, however, also interest in long cooling times. A computer code system^{4,5} has been developed at the Los Alamos Scientific Laboratory (LASL) that uses the ENDF/B-IV fission-product data to calculate cumulative delayed beta and gamma spectra on arbitrary energy grids for arbitrary irradiation histories and cooling times. This code system is shown in Fig. 1.

It can be noted in the figure that the basic ENDF/B-IV fission-product data library is accessed along three paths. The center path, after the preparation of an input library, proceeds via the CINDER-10 code. CINDER-10 is the latest and most versatile version of CINDER, a well-known fission-product and depletion code. The most recent documentation on CINDER is Ref. 4 (for Version 7), but the additional features of Version 10 are discussed in Ref. 6. CINDER-10 calculates fission-product and actinide concentrations, activities, gaseous contents, energy releases, effective group absorption cross sections, etc. for any fissionable nuclide mixture irradiated in arbitrary neutron fluxes for arbitrary intervals of time followed by arbitrary cooling times. The neutron cross sections^{7,8} used in CINDER-10 are generated by spectrum collapse of multigroup data generated with the NJOY code.⁹ This input path to CINDER-10 is the lower path shown in the figure. Spectrum collapse is achieved with the TOAFEW⁸ code.

The ENDF/B-IV data is also accessed by the FPDCYS code along the upper processing path shown in Fig. 1. This code is used to generate multigroup beta and gamma spectra for individual nuclides for which spectral data exist on the ENDF/B-IV file. FPDCYS incorporates four options for calculating beta spectra and two options for calculating gamma spectra. The differences among the four beta-spectrum options are mainly in the ways in which the Fermi function $F(Z,W)$ is represented and calculated. The first of the two gamma-spectrum options consists of incorporating the unbroadened lines weighted by their intensities into an arbitrary number of energy groups. Alternatively, gamma lines are broadened according to detector resolutions before multigrouping in the second option.

The output of FPDCYS and the output of CINDER-10 are input to the FPSPEC code. Actually, only a small portion of the CINDER-10 output is utilized, namely, fission-product activities and total decay energies at the instant of time when corresponding spectra are sought. FPSPEC combines the individual

TABLE I

SUMMARY OF ENDF/B-IV FISSION-PRODUCT DATA FILE CONTENT

824	Nuclides (total)
181	Have differential cross sections
180	Have individual β and γ "lines" (spectral data consisting of energies and intensities)
712	Are unstable and each has an average β , γ , and α energy and branching fraction
10	Yield sets for 6 fissionable nuclides ($\sim 10\,000$ yields)

($\sim 310\,000$ Data entries required in ENDF/B-IV)

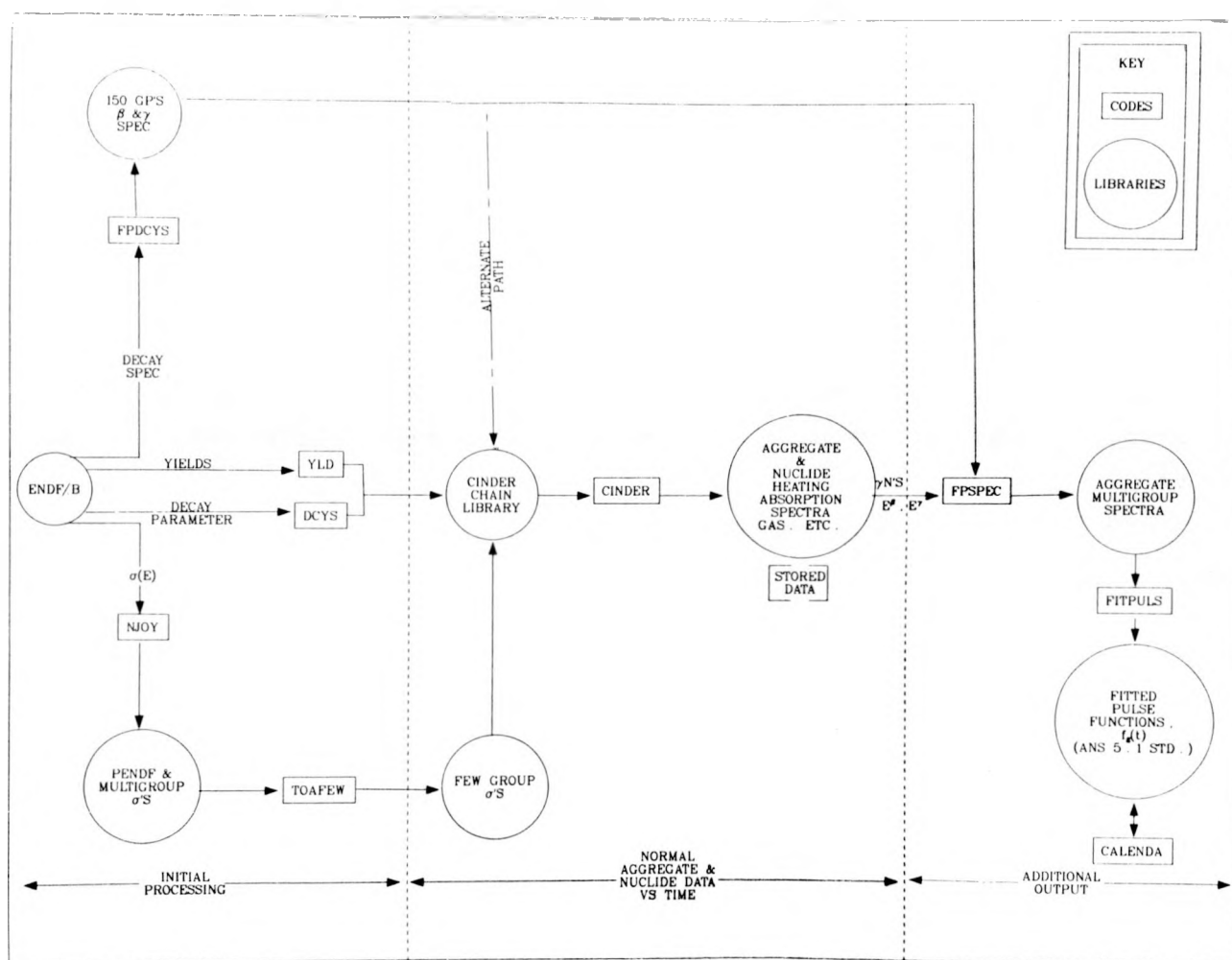


Fig. 1.
LASL nuclide processing codes and libraries.

spectra from FPDCYS and the nuclide activities from CINDER-10 to generate aggregate fission-product spectra for each irradiation and shutdown time. Note that CINDER-10 also incorporates a spectral subroutine capable of utilizing the multigroup data produced by the FPDCYS code. Plots of sample output from FPSPEC are shown in Figs. 2-5. In these illustrations, the calculated spectra are compared with the LASL experiment cited in Ref. 10.

As indicated above, spectral data are not available for all 824 fission products in ENDF/B-IV, and missing spectra must be approximately constructed. This is done for a particular nuclide by assuming that the shape of the beta (or gamma) spectrum for the nuclide is approximated by the spectrum shape of the aggregate 181 nuclides from a pulse after a cooling time approximately equal to the half-life of the nuclide in question. This shape is then normalized to the average beta- (gamma-) decay energy of the nuclide. Figures 6 and 7, respectively, compare the gamma spectra of ^{139}Cs with those constructed for a hypothetical nuclide having the same half-life and average gamma- and beta-decay energies as ^{139}Cs . The nuclide ^{139}Cs is a relatively important nuclide in the 0.1-s cooling time bin for 20 000-h thermal irradiation of ^{235}U . *However, it should be noted that such constructed individual spectra are used only in the aggregate.*

The libraries used in the CINDER-10 and auxiliary codes FPDCYS and FPSPEC are extensive and the codes are designed to use the libraries for any specified irradiation history. However, for many users the scope of application is unnecessary and aggregate results, rather than the detailed nuclide-by-nuclide output, are needed. The purpose of this report and the associated codes described is to eliminate the need for extensive summation code calculations for a wide range of problems. The summation codes and libraries have been used to produce multigroup beta and gamma spectra vs time following fission pulses, including the components of the spectra due to halogens and noble gases for a wide range of applications.

We have used the summation codes and libraries to produce secondary aggregate libraries and pulse functions shown as "additional output" in Fig. 1, which can be used directly or incorporated into neutronics codes. In particular, we have

- Used the summation codes to produce beta- and gamma-temporal spectra in 150 groups following fission pulses for each fuel and fission neutron energy in ENDF/B-IV and stored the results in formats similar to ENDF/B. These files delineate the noble gas and halogen spectra. Users can readily collapse the results to other multigroup spectra.

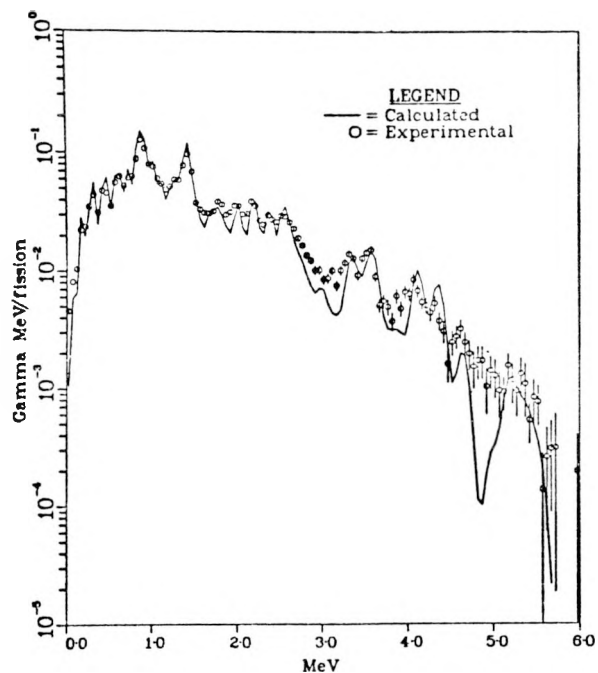


Fig. 2.
Gamma spectrum 5.56-h irradiation
of ^{235}U , 70-s cooling.

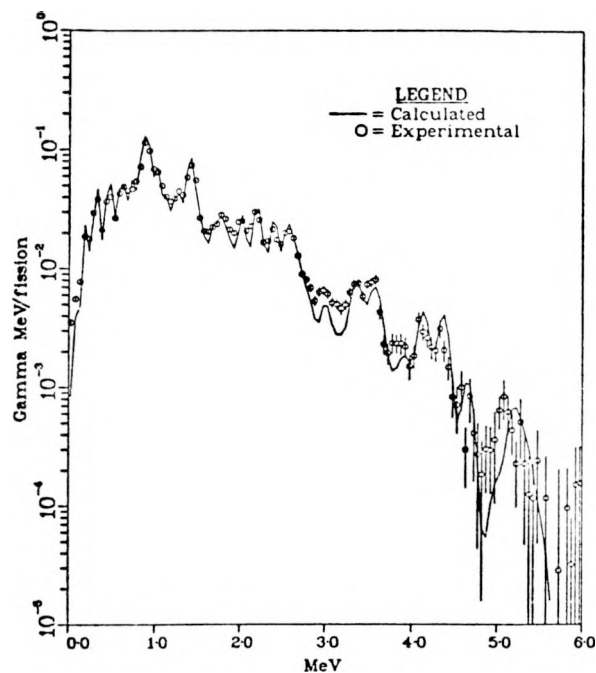


Fig. 3.
Gamma spectrum, 5.56-h irradiation
of ^{235}U , 199-s cooling.

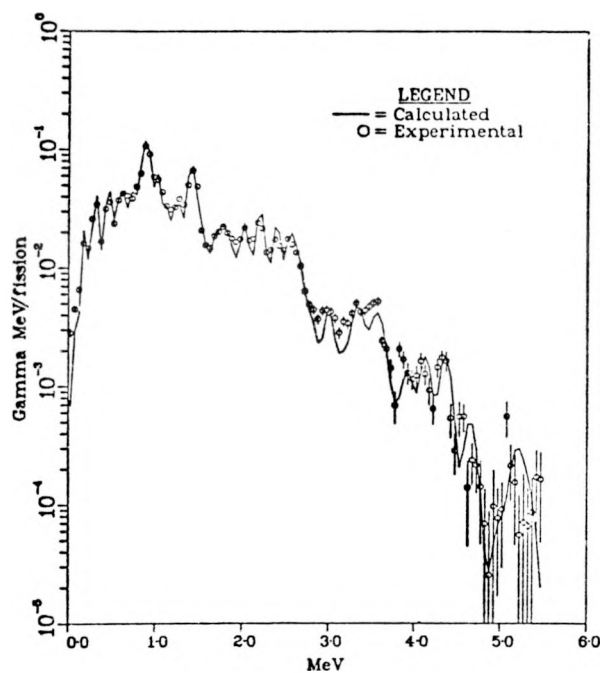


Fig. 4.
Gamma spectrum, 5.56-h irradiation
of ^{235}U , 388-s cooling.

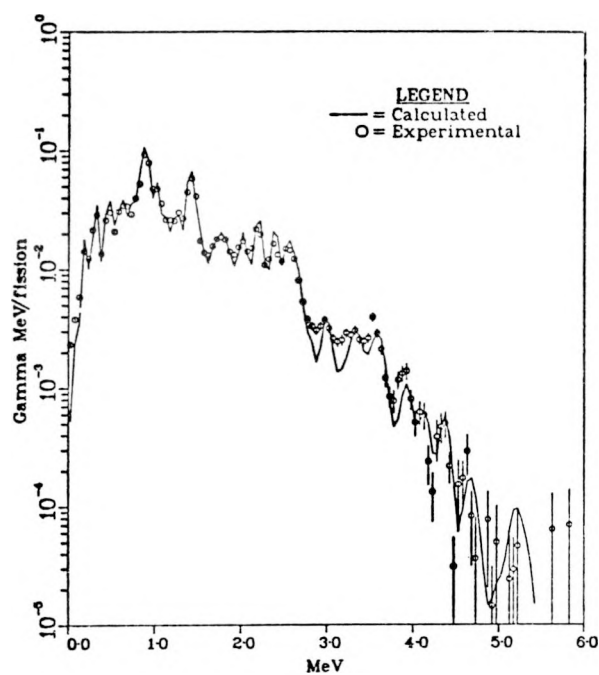


Fig. 5
Gamma spectrum, 5.56-h irradiation
of ^{235}U , 660-s cooling.

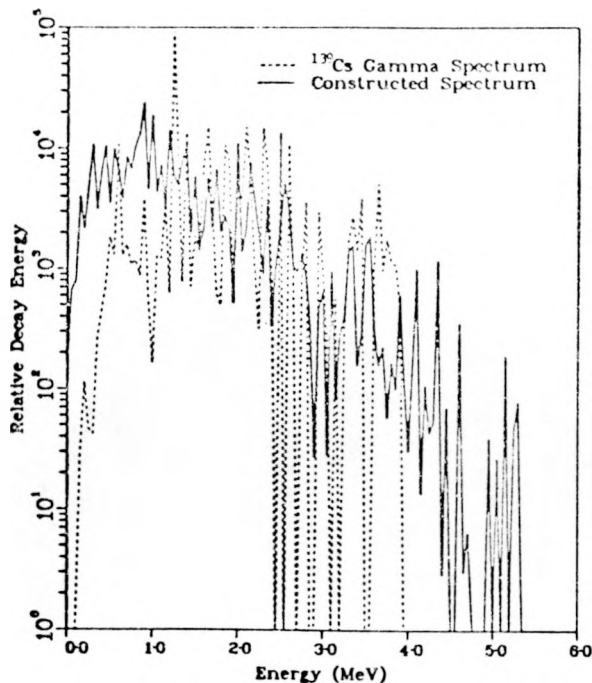


Fig. 6.
 ^{139}Cs gamma spectrum compared with constructed spectrum.

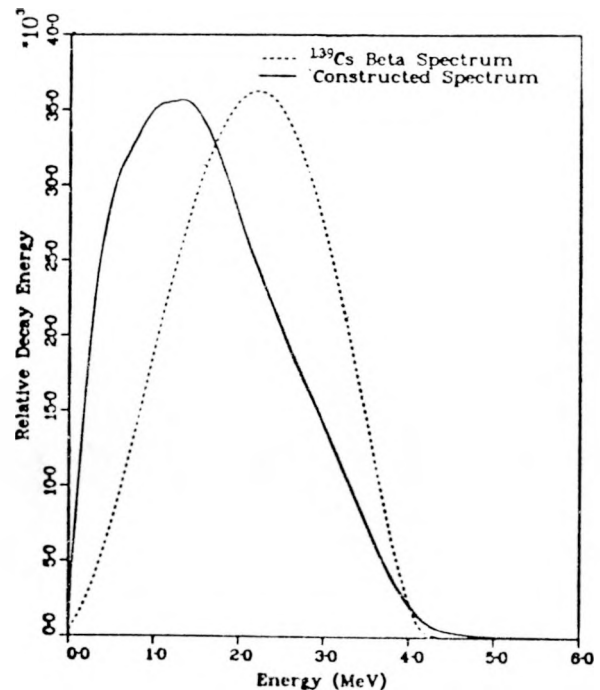


Fig. 7.
 ^{139}Cs beta spectrum compared with constructed spectrum.

- Collapsing and exponential fitting and folding codes are also described, the latter being useful for generation of spectra following finite power histories.
- For immediate use, exponential fits to a particular few-group spectra are provided in this report.

Because the spectra are based on fission pulses, the libraries have a general utility. The exponential fits, for example, can be folded into any power (fission) history that can be described analytically or by a histogram representation. The effects of neutron absorption are also described and approximately accounted for in the methodology.

II. LIBRARY FOR PROCESSED ENDF/B AGGREGATE FISSION PRODUCT SPECTRA

Of particular interest is the application of the LASL code system to produce delayed beta- and gamma-spectral data on a fine energy grid (150 groups in 0.05 MeV steps from 0 to 7.5 MeV) for irradiation of the ENDF/B-IV fissionable nuclides with very short pulses (typically 10^{-4} -s irradiation time; shorter pulses do not alter the calculated spectra) of thermal, fast, and 14-MeV neutrons. The results can then be further processed into broad groups and fit with

functions of the type $f_c(t) = \sum_{i=1}^n \alpha_i e^{-\lambda_i t}$, as described in Secs. III and IV.

The fine-group results from the LASL code system are assembled into a single library in an ENDF-like format.¹¹ Definitions for the format for this processed ENDF/B fission-product and energy-yield data (PEFPYD) library are as follows.

MAT: Mat-No. of target nucleus, same as in ENDF/B.

MF: File No., used to identify energy type of incident neutron, defined as follows:

MF=80 - fission induced by thermal neutrons

MF=81 - fission induced by fast neutrons

MF=82 - fission induced by high-energy (14-MeV) neutrons.

Fission nuclide and energy combinations available in ENDF/B-IV are given in Table II.

MT: Section number used to describe data contents of the section. MT numbers are as follows:

MT=801 - delayed energy/fission for $\beta^- + \gamma$ summed over all fission products

MT=802 - delayed energy/fission for β^- summed over all fission products

MT=803 - delayed energy/fission for γ summed over all fission products

MT=811 - delayed energy/fission for $\beta^- + \gamma$ summed over all gaseous fission products (halogens plus noble gases)

MT=812 - delayed energy/fission for β^- summed over all gaseous fission products

MT=813 - delayed energy/fission for γ summed over all gaseous fission products

MT=821 - delayed energy/fission for $\gamma + \beta^-$ summed over the noble gas fission products

MT=822 - delayed energy/fission for β^- summed over noble gas fission products

MT=823 - delayed energy/fission for γ summed over noble gas fission products

MT=831 - delayed energy/fission for $\beta^- + \gamma$ summed over halogen fission products

MT=832 - delayed energy/fission for β^- summed over halogen fission products

MT=833 - delayed energy/fission for γ summed over halogen fission products

Other MT-numbers can be defined as needed; for example, MT-numbers could be assigned to any of the above spectra summed over energy.

TABLE II
FISSION YIELD DATA IN ENDF/B-IV

Nuclide	Incident Neutron Energy Type		
	Thermal	Fast	High Energy (14 MeV)
^{232}Th	--	Yes	No
^{233}U	Yes	No	No
^{235}U	Yes	Yes	Yes
^{238}U	--	Yes	Yes
^{239}Pu	Yes	Yes	No
^{241}Pu	Yes	No	No

The data are given in a TAB2 record with tables of spectra (decay energy/fission vs energy) given for a number of cooling times. Standard ENDF/B interpolation schemes between cooling times (TAB2 interpolation) are not recommended and, in any case, would be of interest only for fission pulses. However, when the pulse data are placed on a broad-group mesh and fitted with parameters as described in Secs. III and IV, calculations for any irradiation-cooling time combinations are possible, precluding the need for interpolation on the fine grid. Histogram interpolation is assigned for TAB1 interpolations.

File 1 (MF=1) information is also included, giving some processing information and a "dictionary" of the data to follow. The structure of MF=1 is as described in ENDF-102.¹¹ The structure of a section containing the processed data is

```
[MAT,MF,MT/ZA,AWR,0,0,0,0] HEAD
[MAT,MF,MT/0.0,0.0,0,0,1,NTS/TSint] TAB2
[MAT,MF,MT/0.0,TS1,0,0,1,NP/E'int/DE(E',TS1)] TAB1
[MAT,MF,MT/0.0,TS2,0,0,1,NP/E'int/DE(E',TS2)] TAB1
- - - - -
- - - - -
[MAT,MF,MT/0.0,TDNFS,0,0,1,NP/E'int/DE(E',TSNTS)] TAB1
[MAT,MF,MT/0.0,0.0,0,0,0,0] SEND
```

where

TS = cooling time step in seconds

DE = decay energy in MeV/fission (MeV/s)/(fiss/s)

E' = energy of particle (β^-) [photon (γ)] in MeV

NTS = number of cooling time steps given for a particular MT

NP = number of DE,E' pairs given in a particular TAB1 record.

Other quantities are defined in ENDF-102. Note that interpolation along cooling-time steps (the TAB2 records) is always set to zero, meaning that interpolation is not recommended, and that interpolation is always set to one (histogram) for the TAB1 records. A sample PEFPHYD listing is given in Appendix A.

III. REDUCING AND FITTING THE PEFPHYD DATA -- THE FITPULS CODE

In general, the data in the PEFPHYD library are too detailed along the energy axis and not detailed enough along the cooling-time axis for application to design problems. The FITPULS code is designed to access the PEFPHYD library, collapse the 150 energy-group spectra into few groups (up to 25), and fit the resulting spectra along the cooling-time axis with a linear combination of functions of the type

$$fc(t) = \sum_{i=1}^n \alpha_i e^{-\lambda_i t} \quad (\text{MeV/fiss/s}) . \quad (1)$$

Note that there are two sets of parameters in Eq. (1), namely, the set of α_i and the set of λ_i . FITPULS contains options allowing either a least-squares single-parameter fit, that is, a fit of the α 's, given a set of λ 's, or a nonlinear least-squares two-parameter fit (a simultaneous fit of both the α 's and λ 's). The first option is described in detail in Ref. 12, and the second uses the nonlinear least-squares STEPIT routine described in Ref. 13.

In both fitting routines, comparisons between calculated and original values are made for every data point. This, however, is not sufficient to guarantee a good fit, because the function may oscillate wildly between data points. A subroutine called FINECHK detects such oscillations by calculating the function on a fine grid and printing out values differing more than 10% from those calculated using a simple semilog interpolation between points on either side. If this difference exceeds 100%, the point is additionally flagged by FINECHK; if negative values occur, the user is warned that a fit has not been achieved.

The percentage differences flagged are arbitrary and may be changed by the user. Also, it is suggested that the user insert a plotting option at this point in the code so that oscillations in the fit can be inspected visually. The LASL CDC-7600 version of FITPULS contains the LASL plotting routines that compare the fine-mesh points calculated in FINECHK with the original data. The FINECHK routine will also flag those calculated points where slopes are ascending, thus giving additional indications of possible problems with the functional fit.

Normally, the two-parameter nonlinear fitting routine STEPIT will run to convergence at minimum chi-square, but an option is in FITPULS to stop the calculation when an input maximum allowed percent deviation (DIFLIM) of the calculated values from all original values has been achieved. For efficiency of code operation, it is suggested that the user set DIFLIM high in early passes and tighten up as desired convergence is approached.

Although in principal a two-parameter fit can be made from scratch, given a reasonable set of parameters for a particular coarse group structure, a great saving in total problem running time can be attained by first running single-parameter fits. The code contains several options for selecting initial λ 's, removing duplicate λ 's, making adjustments for resulting negative coefficients with large values, etc. *In fact, this and other fitting codes can only be run effectively with a rather large amount of user interaction, as indicated by the discussion in Sec. IV.*

The FITPULS code also has an option for obtaining fitted pulse parameters from data given for finite-irradiation times (IRAD=1 option). This option is particularly useful for reducing data from a number of different experiments with different irradiation times to pulses for comparison purposes.

The technique of running FITPULS in the normal mode, for example, IRAD=0, is provided in the example problem sequence below. A listing of the FITPULS code is given in Appendix B and input specifications are listed in Table III.

IV. FITPULS INPUT AND SAMPLE PROBLEM: A USEFUL FITTED SPECTRUM

The input specifications for the FITPULS code are shown in Table III. As a sample problem, consider a multigroup collapse of the PEFPYD data for the gamma spectra of fission products produced by a pulse (10^{-4} -s irradiation time) of thermal neutrons on ^{233}U , (MAT1=1260, MF1=80, and MT1=803). Some of the PEFPYD data used in this example are shown in Appendix A. The broad-group structure used for this problem is shown in Table IV. Note that there are

TABLE III
FITPULS INPUT SPECIFICATIONS

<u>Card No.</u>	<u>Format</u>	<u>Variable</u>	<u>Comment</u>
(Input for Subroutine CORSBIN)			
1	6I11	MAT1	MAT-No of desired fissioning nuclide.
		MF1	MF desired (incident energy type).
		MT1	MT desired (particle/photon data type).
2	6I11	NE	No. of desired broad groups + 1.
3	6E11.4	EB(I)	Energy bounds in MeV, including lower and upper bounds. Read low to high energy.
(Input for Program FITPULS)			
1	12I6	NPUN	Set NPUN = 7 here if rebinned data cards wanted; otherwise set to zero.
		IRAD	Set IRAD = 0 for regular pulse fit, set IRAD = 1 to reduce finite irradiation data to pulse.
		NCORS	Set NCORS = 0 to call subroutine CORSBIN. Set NCORS = 1 for no call, i.e., if input data is not to be rebinned, which is usually the case for fitting experimental data (IRAD = 1).
2	8A10	TITL(I)	80 character title, if TITLE(1) = SELECT subroutine SELECT is called and this input goes here (see SELECT input). If TITLE(1) = DO NOT GO, program stops.
3	12I6	IPROB	Problem No. Make negative if fit is to be made in segments. See conditional input below.
		NTOTER	Option to read data from cards. Used for experimental data. See subroutine RUNTOTS.
		NPUN	Flag for punched output. Set equal to 7 if punched output is desired, equal to 20 if punched output not desired. In general, punched output is needed for subsequent runs.

TABLE III (cont)

<u>Card No.</u>	<u>Format</u>	<u>Variable</u>	<u>Comment</u>
3 (cont.)		NSTEP	Flag to call subroutine DHFIT, which calls the routine STEPIT, which performs a two-parameter fit. Routine usually not called until a couple of passes are made to get a coarse adjustment of the parameters with a single fit. Set equal to zero if call to DHFIT is not desired, otherwise set to 1. Also note below option for calling DHFIT by group.
		NFINL	Flag for option to read all parameters for all groups from previous problem. Used when striving for final convergence. Set equal to 1 to activate, otherwise set equal to zero. See conditional input below.
4	6E12.5	DIFLIM	Maximum per cent deviation allowed in STEPIT. Set high on initial passes and tighten up as desired convergence is approached.
		RUNTIM	Running time. Make fraction of second less than time limit set on control card to get punched cards for subsequent run.
		TMIN	Minimum cooling time desired. If set to zero, code will choose minimum cooling time available on data file.
		TMAX	Maximum cooling time desired. If set to zero, code will choose maximum cooling time available on data file.
		GXMIN	Minimum allowed value of decay energy. Set so fit is limited to about 15 decades.
5	12I6	KKN(I)	Flags for calling STEPIT routine (two-parameter fit) by group. If call for a particular group, say Group IG, is desired, set KKN(IG) = IG. If call is not desired, set KKN(IG) = zero.

FITPULS Conditional Input

If NFINL = 1, cards output from previous problems are read here. These cards are the α 's and λ 's for all groups, and they are in an ENDF-like format. If NFINL = 1, no further input is needed. Note, however, that α 's and λ 's for particular

TABLE III (cont)

<u>Card No.</u>	<u>Format</u>	<u>Variable</u>	<u>Comment</u>
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groups can be entered in subroutine PULSFIT, distinct from this option in that they need not be entered for every group, thus permitting a mixture of options.

IPROB set negative allows the data for the groups to be fitted in several segments.

KKN is set negative for a particular group if a call to subroutine TRMSEE is desired. (See code listing in Appendix B.)

5	12I6	NSEG	Number of segments + 1
		NS(I)	Breakpoints of segments

(Input for subroutine PULSFIT)

1	12I6	LWT	Weight function desired in single parameter fit. If LWT = 0, Weight function = 1 If LWT = 1, Weight function = $1/FX$ If LWT = 2, Weight function = $1/FX^2$ If LWT = 3, Weight function = $1/FX^{1.5}$
		NOK	Flag for parameter selection
		KTRM	Flag for parameter selection. NOK, KTRM combination determines the option by which the initial λ 's for the group are selected. See below.
		IPRT	Flag for print option. Set equal to 1 for complete print, otherwise set to zero.

NOK, KTRM specifications, NOK = 0, KTRM = number of λ 's to be read in.

2	3(11X,E11.4)	ALAMDA(K)	Read in (ALAMDA(K), K = 1, KTRM) (Note from format that if cards from previous run are used, coefficients will not be read.)
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NOK = 1, KTRM = 1, λ 's calculated at every pair of cooling time-decay energy points. (No input is necessary, and card No. 2 does not exist.)

TABLE III (cont)

<u>Card No.</u>	<u>Format</u>	<u>Variable</u>	<u>Comment</u>
NOK = 1, KTRM = number of λ 's to be calculated by code.			
2	12I6	KCAL(L)	Selects points between which λ 's are to be calculated. First point is always selected by code. Read KCAL(L), L = 2, KTRM
NOK = 2, KTRM = 1, cards in ENDF-like format from previous problem for this group are read in here, and the subroutine returns immediately to main program. No further input is needed for this group. This option is used after a single-parameter fit has been made in a previous pass, and two-parameter fitting is now being done in STEPIT for this group. This is similar to the NFINL = 1 option in the main program, except that the two-parameter fits are allowed on a group-by-group basis.			
3	12I6	IWANT	Select λ 's wanted by position number. If all are to be retained, as in a first pass, set equal to zero.
		KCAL(L)	Position numbers of λ 's to be kept. Do not enter if IWANT = 0.
(Input for subroutine SELECT)			
1	12I6	ITS,ITP	Number of time steps desired, indexes of desired time steps. SELECT used if one wishes to fit a subset of a particular data file, and this input follows the title code.
(Input for subroutine TRMSEE)			
1	12I6	MLT	Number of parameters to be changed
2	I6	L	Time step number of parameters to be changed
	E12.5	ALF(K,L)	New value of α
	E12.5	ALAM(K,L)	New value of λ
3	12I6	LT	Number of terms to be removed
		LTM(L)	Term numbers of terms removed

TABLE IV

GROUP STRUCTURE USED FOR SAMPLE PROBLEM

<u>Group No.</u>	<u>Lower Energy Boundary (MeV)</u>	<u>Upper Energy Boundary (MeV)</u>
1	0.10	0.40
2	0.40	0.90
3	0.90	1.35
4	1.35	1.80
5	1.80	2.20
6	2.20	2.60
7	2.60	3.00
8	3.00	4.00
9	4.00	5.00
10	5.00	6.00
11	6.00	7.00

NOTE: There are essentially no data on PEFPPYS
for $E > 7.0$ MeV

negligible gammas above 7 MeV, the upper bound of the last group. Also note that in collapsing to the broad-group structure, the code changes the units of the fission-product decay energy from MeV/fission to MeV/fission-s, the standard units in use for pulse functions.

For the first pass, we make only a single-parameter fit¹² and allow the code to calculate initial λ 's from semilog slopes between pairs of cooling-time and gamma-energy (MeV/fission-s) points. This is done by setting the input as follows:

Input to Program FITPULS

Card 1 NPUN = 20
 IRAD = 0
 NCORS = 0

Input to Subroutine CORSBIN

Card 1 MAT1 = 1260
 MF1 = 80
 MT1 = 803

Card 2 NE = 12

Card 3 (group bounds from Table IV)

Input to Program FITPULS (cont.)

Card 2 IPROB = 1
 NTOTER = 0
 NPUN = 7
 NSTEP = 0
 NFINL = 0

Card 3 DIFLIM = 1.0 (not used in this run)
 RUNTIM = 29.9 (not needed in this run)
 TMIN = 0.1
 TMAX = 1.0E+9
 GXMAX = 1.0E-21

Card 4 KKN(K) = group numbers, although not used in this run as NSTEP = 0

Input to subroutine PULSFIT

Card 1 LWT = 1
 NOK = 1
 KTRM = 1
 IPRT = 0

Card 2 IWANT = 0

Repeat cards 1 and 2 for each energy group.

Examination of the results of pass No. 1 reveal that (a) groups 1, 2, 3, and 10 appear converged and plots are smooth; (b) although groups 4, 5, 6, 7, and 9 appear converged, plots show rather large reversals in shape; and (c) fits are not achieved by groups 8 and 11, as negative computed values occur between fitted points. This run took 30 s on the CDC-7600 computer.

For the second pass, we keep the same input as pass No. 1, except we set $LWT = 3$ for groups 4, 5, 6, 7, 8, and 9. As a result, all groups are apparently fitted to within 1% except group 9, but plots are not smooth for groups 4, 5, 6, 7, 8, and 9 as illustrated in Fig. 8 for group 4. Note the apparent reverse of slope near a cooling time of 100 s, not indicated by the input data points. Examination of the parameters for these indicates that there is a large negative value of α in the sixth pair of parameters for each group. These pairs of parameters are eliminated in the third pass. The running time for pass No. 2 was 25 s.

The input for pass No. 3 is the same as that for the second pass, except for groups 4, 5, and 6 in subroutine PULSFIT. This is now as follows.

```
Card 1  LWT = 3
        NOK = 1
        KTRM = 1
        IPRT = 0
```

```
Card 2  IWANT = 20
```

```
KCAL(J) = 1,2,3,4,5,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21
          (note parameter number 6 is omitted)
```

The results of the third pass indicate that plots for groups 4, 5, 6, 7, and 9 are now smooth, as illustrated in Fig. 9 for group 4. The running time for pass No. 3 was 31 s.

Smooth fits for groups 7, 8, and 9 were not obtained in the first three runs, as shown in Fig. 10 for group 8. An additional run (run No. 4) was made for these three groups in which the input was the same as that used in run No. 2 except that the option for selecting the points for the fit was used. This option is activated by setting the first characters of the title card to the word "SELECT." The input was set to remove the points at cooling-time steps of 0.5, 5, and 50 s. This effectively smoothed the fits for groups 7, 8, and 9, as shown in Fig. 11 for group 8.

The FITPULS input for pass No. 5 is the same as for the previous passes except NSTEP and NFINL are now both set to 1, and the card output from passes

No. 3 and 4 are added after card No. 3. No additional input is needed. The results of this run were that all groups were fitted to within 1% after 104 s of running time. The fits extend to >30 yr of cooling time. These are shown graphically in Figs. 12-22, and a comparison of the parameters for group 4 from the first run with those from the last run are given in Table V.

Note that these fits are not unique, and also that good fits can be obtained by using smaller numbers of parameters. The subroutine TRMSEE can be used to assist the user in reducing the number of parameters. It is called for a particular group by making KKN the negative of the group number.

Parameters for selected incident energy-fissioning nuclide combinations are given in Appendix C. The accuracy of these fits vary from about 2 to 5%, and although closer fits could be obtained, the extra effort hardly seems worthwhile for ENDF/B-IV data. An indication of the accuracy of the ENDF/B-IV fission-product decay and yield data can be obtained by comparison with another evaluated set,¹⁴ as is done in Figs. 23-26, where the spectra are normalized to the same total values. More important validations are the comparisons with experiment.¹⁵ The fits given in Appendix C are certainly as accurate as warranted by the ENDF/B-IV data.

V. APPLICATION OF FITTED PULSE TO CALCULATION OF DECAY-ENERGY SPECTRA AFTER EXTENDED IRRADIATION

The fitted pulse can be folded with a reactor power history so that decay spectra from irradiated fuel can be calculated as a function of cooling time. Consider a reactor operated at variable power $P(t')$, $0 \leq t' \leq T$, for a time interval T followed by a shutdown period t_s . In the following equations, given for a particular energy group,

$$\begin{aligned} t &= \text{time since fission pulse} \\ P(t') &= \text{power in watts at time } t' \\ K &= 0.32042 \times 10^{10} \text{ w-s/fission} \\ T &= \text{total time at power} \\ t_s &= \text{shutdown time of interest, measured from } T, \text{ and} \\ H(t, T) &= \text{decay-energy release at time } (T+t_s) \text{ for some energy bin (MeV/s).} \end{aligned}$$

$$fc = \sum_{k=1}^L \alpha_k e^{-\lambda_k t}, \quad \text{MeV/fiss-s}, \quad (2)$$

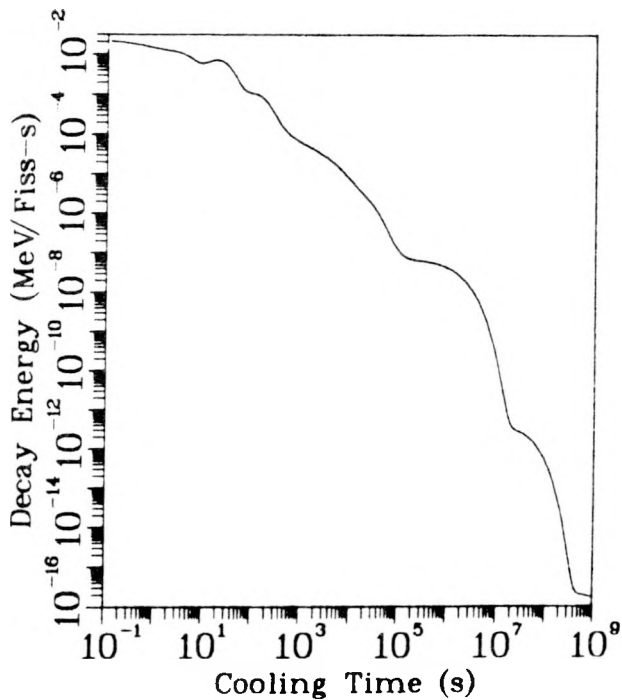


Fig. 8.
Fit for group 4 after second pass
through FITPULS.

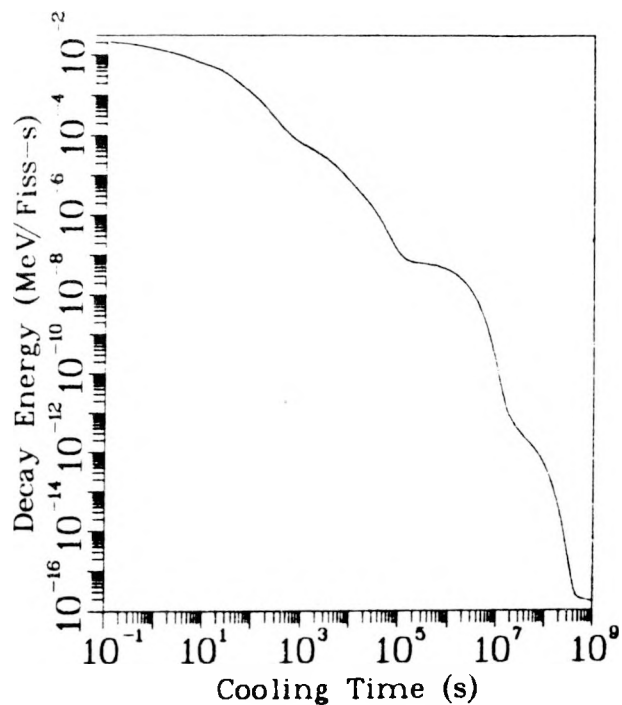


Fig. 9.
Fit for group 4 after final pass
through FITPULS.

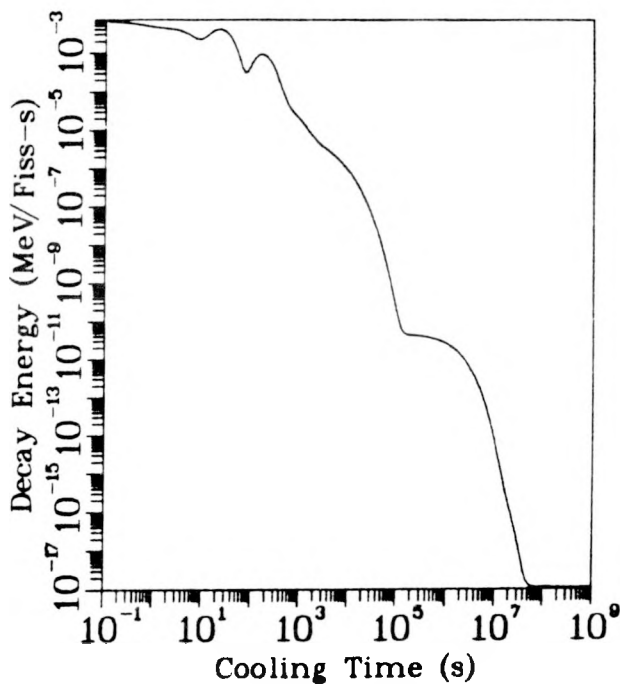


Fig. 10.
Fit for group 8 after second pass
through FITPULS.

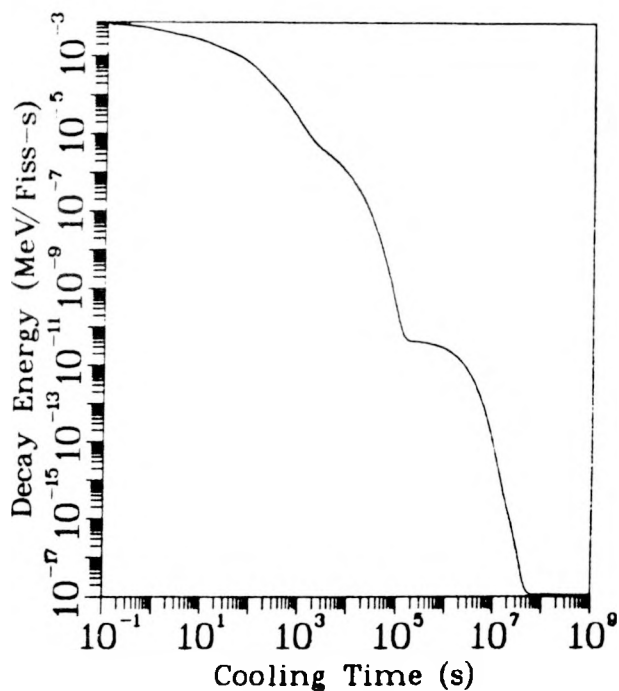


Fig. 11.
Fit for group 8 after final pass
through FITPULS.

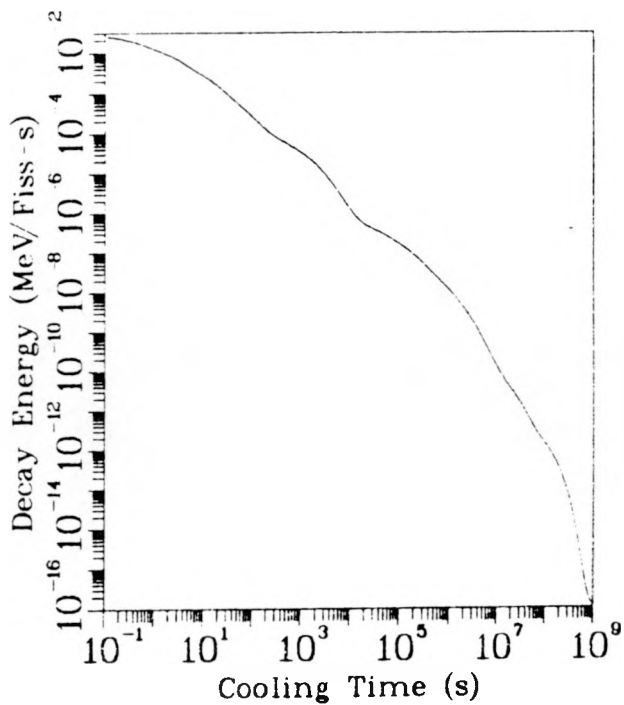


Fig. 12.
Final fit for group 1.

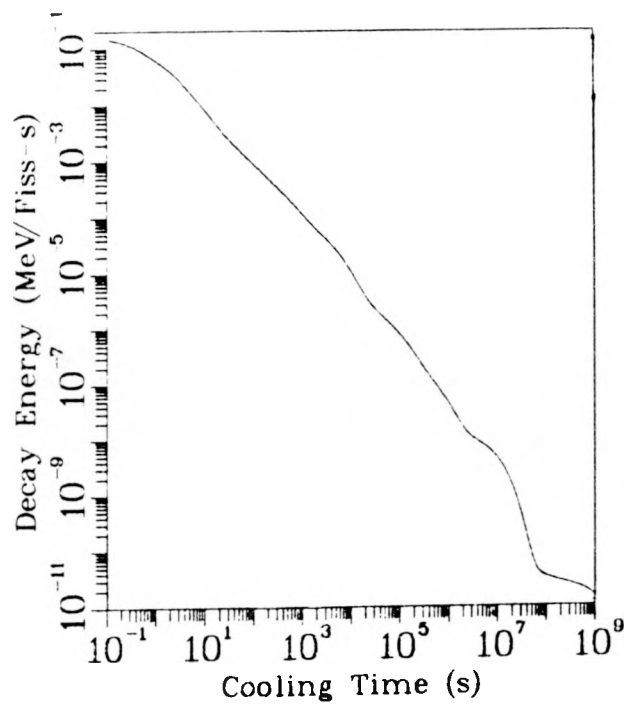


Fig. 13.
Final fit for group 2.

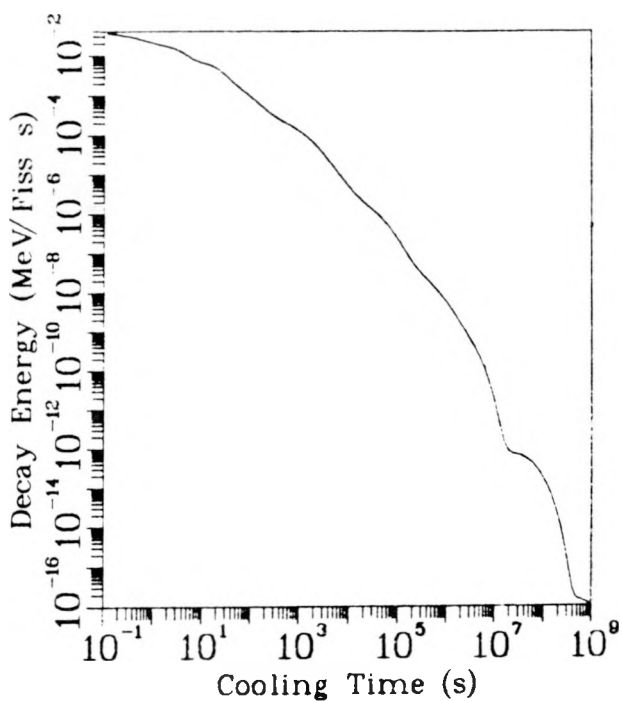


Fig. 14.
Final fit for group 3.

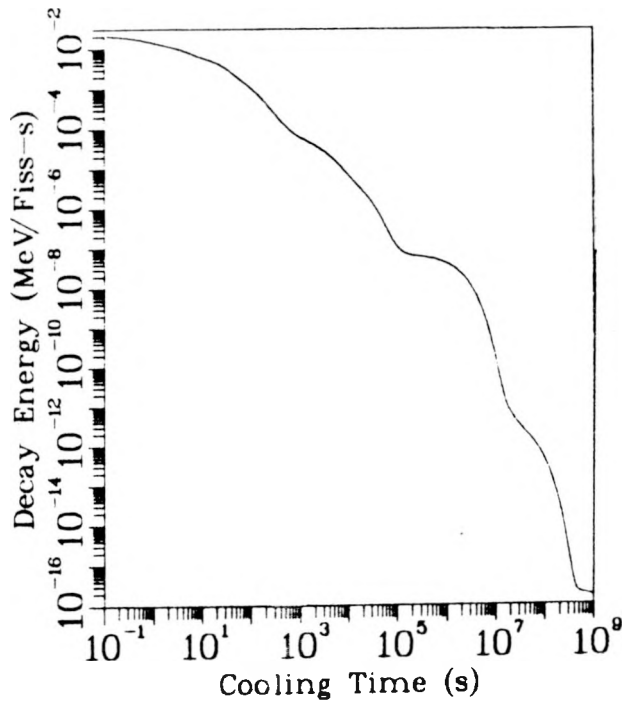


Fig. 15.
Final fit for group 4.

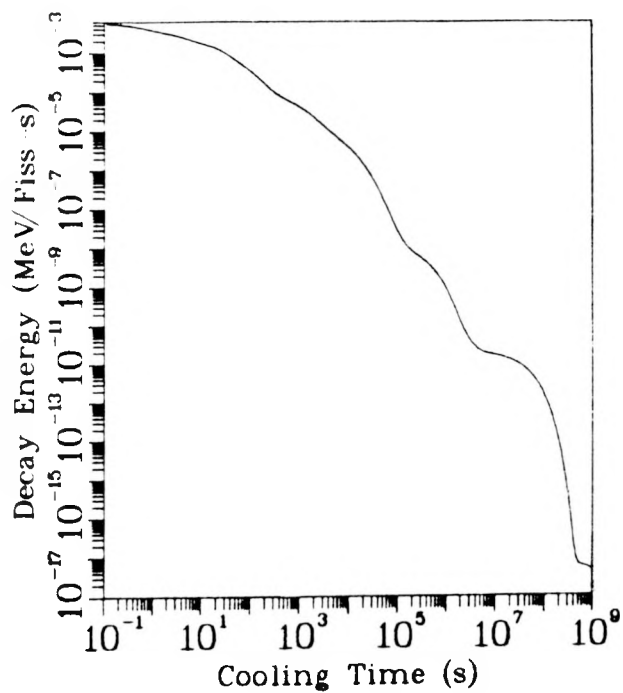


Fig. 16.
Final fit for group 5.

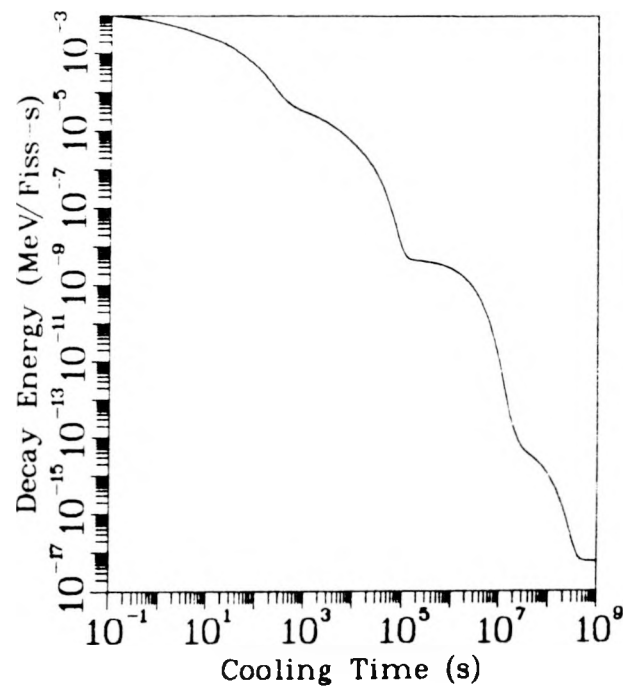


Fig. 17.
Final fit for group 6.

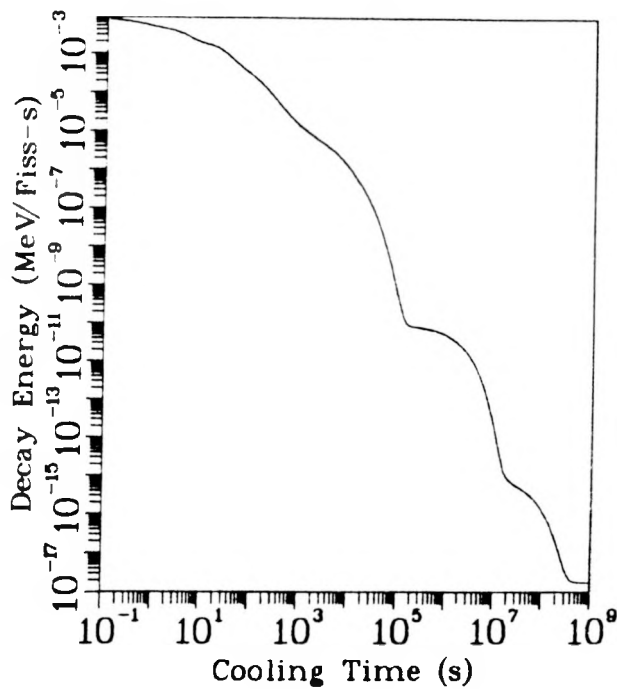


Fig. 18.
Final fit for group 7.

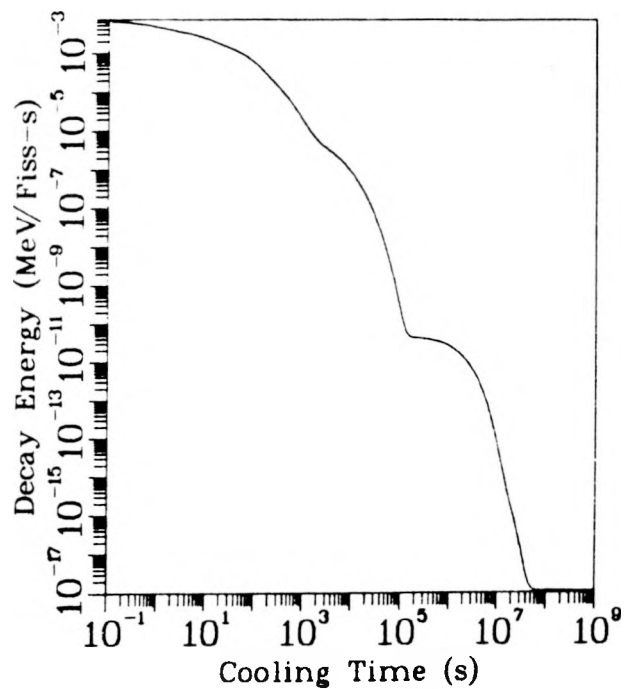


Fig. 19.
Final fit for group 8.

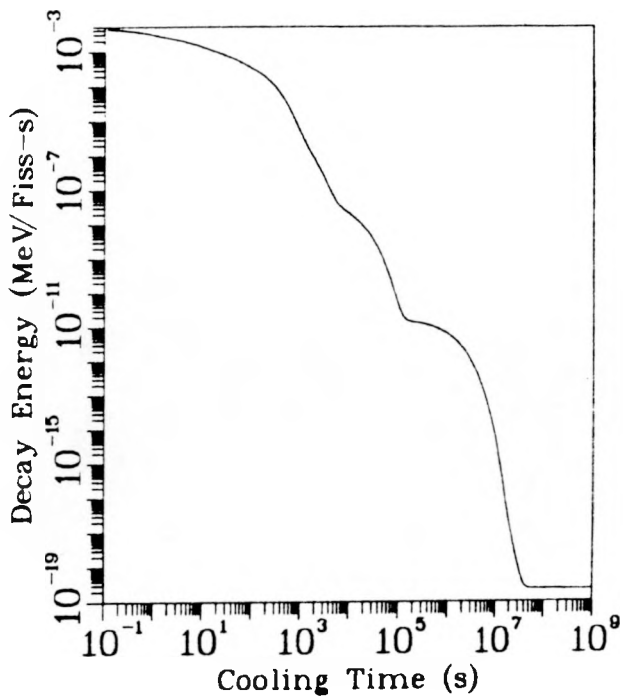


Fig. 20.
Final fit for group 9.

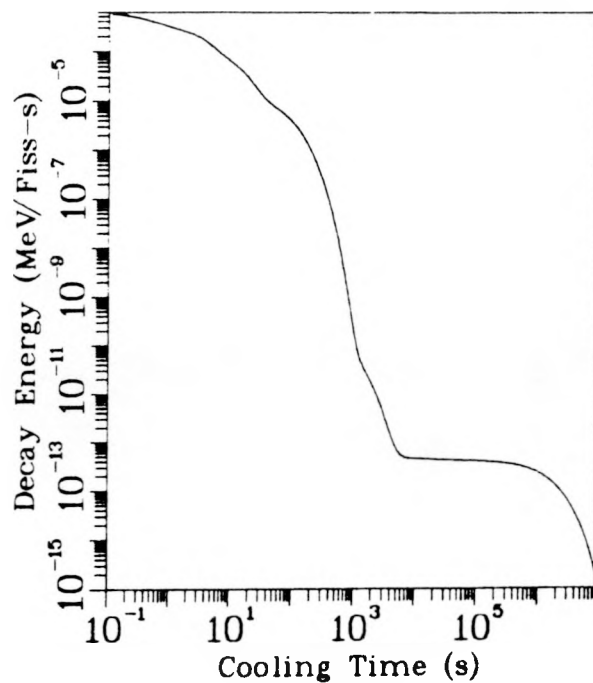


Fig. 21.
Final fit for group 10.

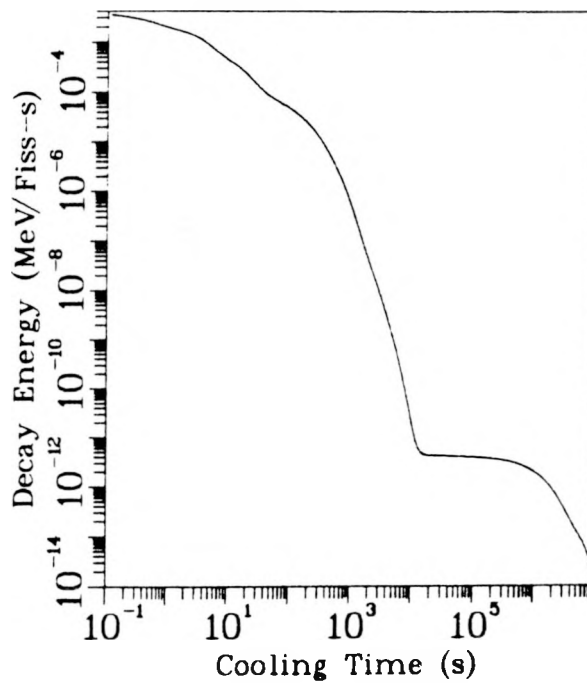


Fig. 22.
Final fit for group 11.

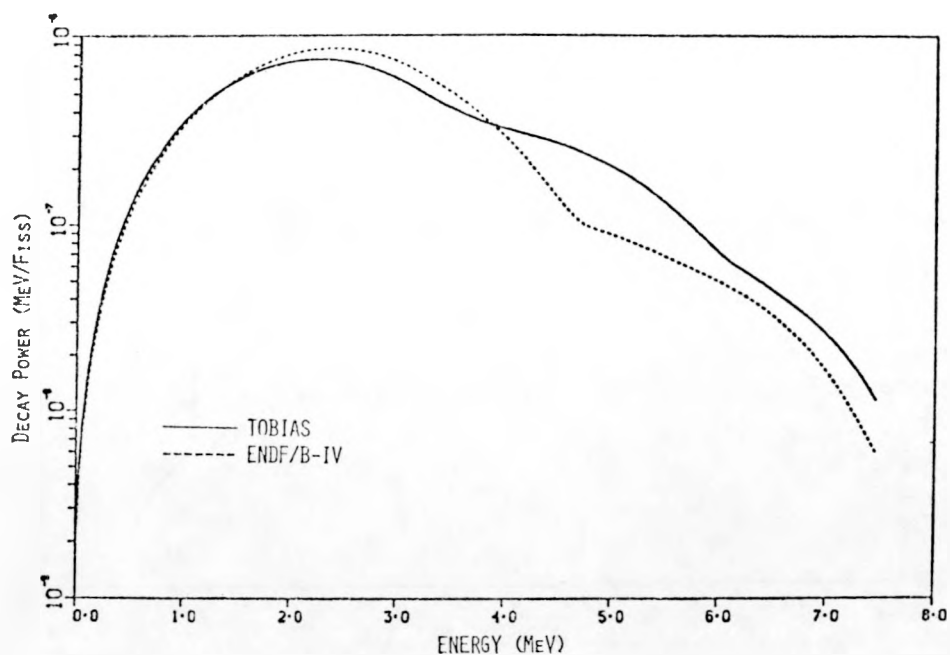


Fig. 23.

ENDF/B-IV beta-spectra comparison with UK Data File, all fission products, betas (cooling time 0.1 s).

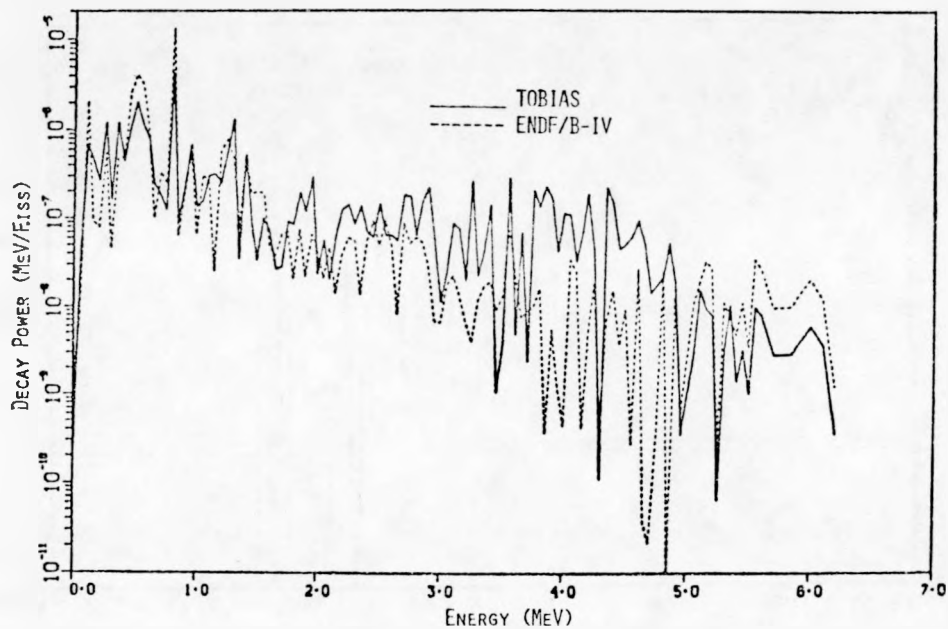


Fig. 24.

ENDF/B-IV gamma-spectra comparisons with UK Data File, all fission products, gammas (cooling time 0.1 s).

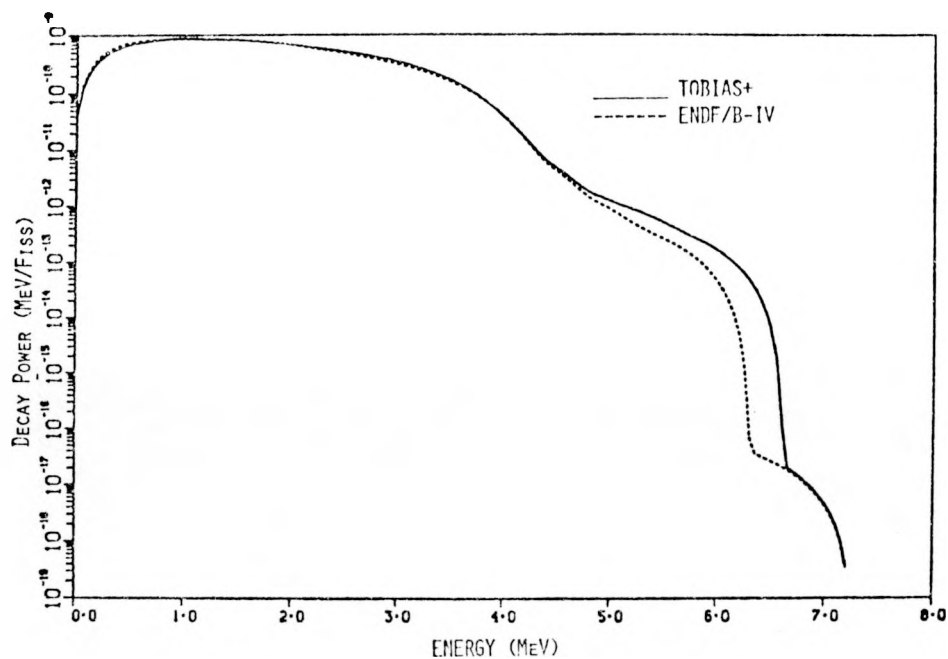


Fig. 25.
 ENDF/B-IV beta-spectra comparison with UK Data File,
 all fission products, betas (cooling time 1000 s).

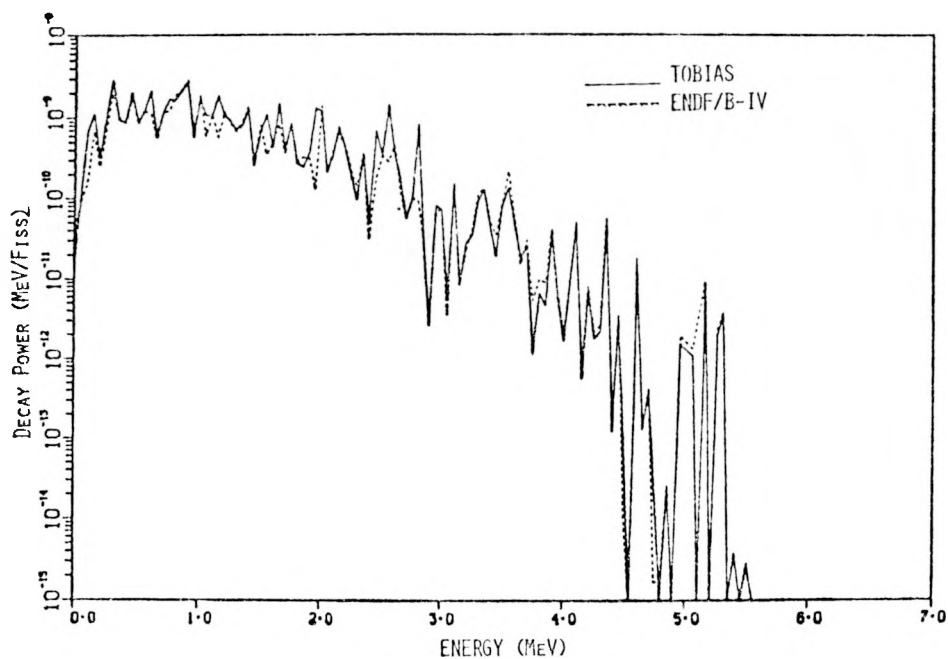


Fig. 26.
 ENDF/B-IV gamma-spectra comparison with UK Data File,
 all fission products, gammas (cooling time 1000 s).

TABLE V

COMPARISON OF GROUP 4 PARAMETERS AFTER FIRST PASS
WITH GROUP 4 PARAMETERS AFTER LAST PASS

Group 4 Parameters After First Pass		Group 4 Parameters After Last Pass	
α	λ	α	λ
3.912×10^{-2}	1.152	1.656×10^{-2}	1.297
-1.119×10^{-1}	5.760×10^{-1}	-2.081×10^{-2}	6.712×10^{-1}
1.408×10^{-1}	3.301×10^{-1}	2.335×10^{-2}	3.606×10^{-1}
-1.006×10^{-1}	1.329×10^{-1}	-9.164×10^{-3}	1.415×10^{-1}
6.292×10^{-2}	6.460×10^{-2}	9.333×10^{-3}	6.486×10^{-2}
-1.505×10^{-2}	2.611×10^{-2}		
6.710×10^{-3}	1.383×10^{-2}	2.427×10^{-3}	1.366×10^{-2}
4.864×10^{-4}	5.507×10^{-3}	5.633×10^{-4}	5.521×10^{-3}
5.344×10^{-5}	1.287×10^{-3}	5.195×10^{-5}	1.283×10^{-3}
4.883×10^{-5}	3.279×10^{-4}	4.965×10^{-5}	3.271×10^{-4}
2.318×10^{-6}	1.804×10^{-4}	1.624×10^{-6}	1.568×10^{-4}
7.550×10^{-6}	6.440×10^{-5}	7.552×10^{-6}	6.466×10^{-5}
6.540×10^{-7}	3.068×10^{-5}	6.660×10^{-7}	3.037×10^{-5}
-1.522×10^{-8}	1.722×10^{-6}	-1.297×10^{-8}	2.343×10^{-6}
1.141×10^{-7}	5.725×10^{-7}	8.819×10^{-9}	5.688×10^{-6}
5.353×10^{-7}	6.395×10^{-7}	1.596×10^{-7}	6.395×10^{-7}
-5.628×10^{-7}	6.215×10^{-7}	-8.615×10^{-8}	6.216×10^{-7}
-6.003×10^{-12}	1.127×10^{-7}	7.535×10^{-11}	1.617×10^{-7}
6.433×10^{-12}	2.710×10^{-3}	5.539×10^{-12}	2.705×10^{-8}
-1.140×10^{-13}	1.903×10^{-8}	4.687×10^{-13}	2.437×10^{-8}
2.535×10^{-16}	4.419×10^{-10}	2.295×10^{-16}	3.424×10^{-10}

$H(t_s, T)$ is given by

$$H(t_s, T) = \int_0^T \frac{P(t')}{K} f_c(T+t_s-t') dt' \quad (\text{MeV/s}) \quad (3)$$

or

$$H(t_s, T) = \int_0^T \frac{P(t')}{K} \sum_{k=1}^L e^{-\lambda_k (T+t_s-t')} dt' \quad (\text{MeV/s}) \quad (4)$$

Assume, for example, that the power history can be approximated by J histograms with a power of P_j at irradiation time T_j . Then,

$$H(t_s, T) = \sum_{j=1}^J \frac{P_j}{K} \sum_{k=1}^L \alpha_k \int_{T_{j-1}}^{T_j} e^{-\lambda_k (T+t_s-t')} dT \quad (\text{MeV/s}) \quad (5)$$

or

$$H(t_s, T) = \sum_{j=1}^J \frac{P_j}{K} \sum_{k=1}^L \frac{\alpha_k}{\lambda_k} \left[e^{-\lambda_k (T+t_s-T_j)} - e^{-\lambda_k (T+t_s-T_{j-1})} \right] \quad (\text{MeV/s}) \quad (6)$$

The above expressions, which are developed more generally in Appendix D, do not include the effects of neutron absorption by the fission products that become important for high flux levels and long cooling times (Figs. 27-29). There are two effects of absorption; namely, the flux level can reduce the density of directly yielded products in the fission pulse, significant for those nuclides having large cross sections and large yields; and nuclide coupling in stable and long-lived nuclides tends to build up the concentration of more unstable nuclides.

Positive effects are to be expected from shielded nuclides such as ^{134}Cs , ^{136}Cs , $^{148\text{m}}\text{Pm}$, ^{148}Pm , and ^{154}Eu and, indeed, an examination of the CINDER-10 output of the problems illustrated in Figs. 27-29 reveals that the very large

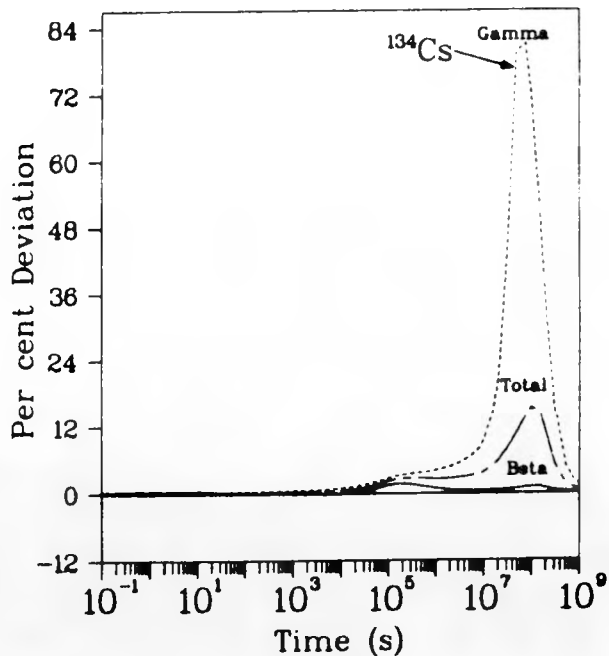


Fig. 27.

Per cent deviation of decay heating due to neutron absorption (^{235}U irradiation for 20 000 h, no depletion ($\phi = 10^{13}$)).

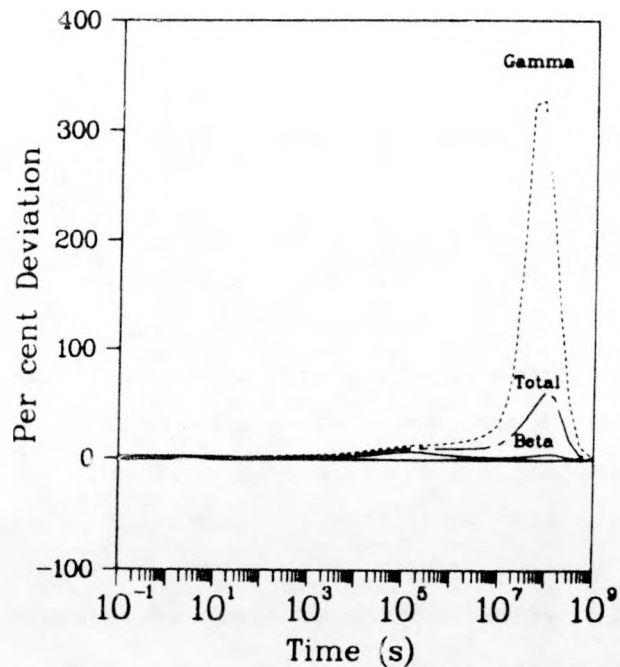


Fig. 28

Per cent deviation of decay heating due to neutron absorption (^{235}U irradiation for 20 000 h, no depletion ($\phi = 10^{14}$)).

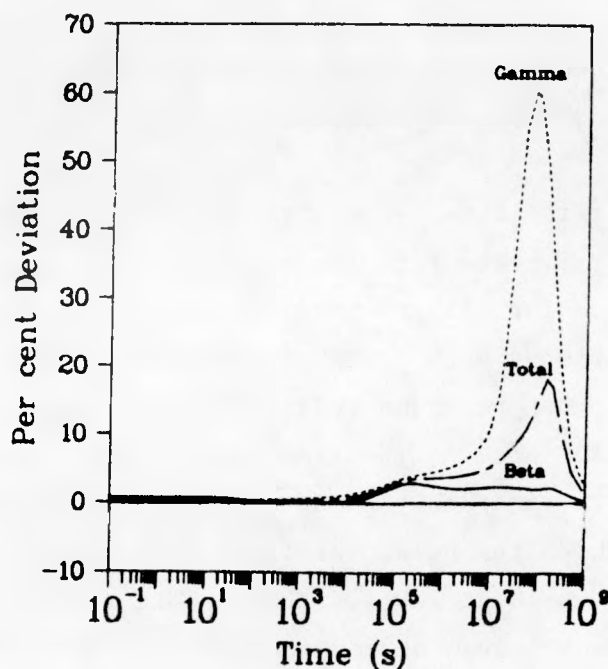


Fig. 29.

Per cent deviation of decay heating due to neutron absorption (^{239}Pu irradiation for 20 000 h, no depletion ($\phi = 10^{13}$)).

effect at cooling times near 10^8 s is due to neutron absorption in the stable nuclide ^{133}Cs , which produces the shielded nuclide ^{134}Cs . Therefore, it is readily calculated by use of the simple two-nuclide chain $^{133}\text{Cs}(n,\gamma)^{134}\text{Cs}$. Other reactions can be handled in a similar manner, and a list of the more important fission products contributing to absorption effects are given in Table VI. General equations are developed in Appendix D for approximating the effects of absorption with two-nuclide chains.

These equations for the computation of fission-product decay-energy spectra were incorporated into a code CALEND A (calculated decay energy spectra with absorption), which is useful for applying the fits to PEFYPD library data to obtain decay spectra after shutdown for reactor fuel irradiated for extended times at variable power. The present version of the code is limited to (a) a histogram representation of the power history, (b) expression of the neutron flux and cross-section data in two energy groups (fast and thermal), and (c) inclusion of the absorption effects of only those two-nuclide chains shown in Table VI flagged with an *.

In order to test the CALEND A code and, indeed, the practicability of applying the pulse fits to finite irradiation problems, calculations were made for a 20 000-h irradiation of ^{235}U fuel with thermal neutrons at constant fluxes of 10^4 n/cm²/s (that is, negligible absorption) and 10^{14} n/cm²/s. Fission product decay beta and gamma spectra were obtained in the 11-group structure for both cases, and these were compared with results obtained directly with the CINDER-10 code.

The parameters for the beta pulse fits used in the CALEND A calculation are those given in Appendix C. The fits for the beta spectra were to within 1% of the CINDER-10 pulse data for all groups except group 11, which was within 1.5%. The beta-spectra comparisons with CINDER-10 results for several groups, as well as the sum over all groups, are shown in Table VII for the 20 000-h irradiation at a constant flux of 10^4 n/cm²/s (no absorption) case. Note in Table VII that, in general, agreement is remarkably good, even for cooling times less than 0.1 s, the minimum time for which the pulse was fit. Also note, however, the relatively large deviation for group 10 at 100 s. This is due to the fact that the PEFYPD data for the pulse is only given at two points in each cooling-time decade, and thus is insufficient for a more accurate description of the spectra.

To obtain parameters for the gamma fits for the ^{235}U thermal pulse, CINDER-10 data given at six points per decade are used as input to FITPULS. Although the

TABLE VI

FISSION PRODUCTS IMPORTANT IN DETERMINATION OF
NEUTRON ABSORPTION EFFECTS ON DECAY POWER^a

NUCLIDE	PRECURSOR(s)	COMMENTS
* ⁹⁰ _Y	* ⁸⁹ _Y , * ⁹⁰ _{Sr}	
¹⁰⁰ _{Tc}	⁹⁹ _{Tc}	
¹⁰⁴ _{Rh}	¹⁰³ _{Ru}	
¹⁰⁵ _{Rh}	¹⁰⁵ _{Ru}	
¹¹⁶ _{In}	¹¹⁵ _{In}	Degree of importance (small) depends on uncertain branching fractions. Can be ignored based on ENDF/B-IV data.
¹³⁰ _I	¹²⁹ _I , ^{130m} _I	
* ¹³⁴ _{Cs}	* ¹³³ _{Cs}	Very important at all shutdown times.
* ¹³⁵ _{Xe}	* ¹³⁵ _I	Major negative effect
¹³⁶ _{Ca}	¹³⁵ _{Xe} , ¹³⁵ _{Cs}	
* ¹⁴⁰ _{La}	* ¹⁴⁰ _{Ba} , * ¹³⁹ _{La}	
¹⁴² _{Pr}	¹⁴¹ _{Pr}	
* ¹⁴⁴ _{Pr}	* ¹⁴⁴ _{Ce} , * ¹⁴³ _{Pr}	
¹⁴⁷ _{Nd}	¹⁴⁶ _{Nd}	
¹⁴⁸ _{Pm}	¹⁴⁷ _{Nd} , * ¹⁴⁷ _{Pm}	(n,γ) branching from ¹⁴⁷ _{Pm} 0.53.
* ^{148m} _{Pm}	¹⁴⁷ _{Nd} , * ¹⁴⁷ _{Pm}	(n,γ) branching from ¹⁴⁷ _{Pm} 0.47.
¹⁴⁹ _{Pm}	¹⁴⁷ _{Nd} , ¹⁴⁷ _{Pm} , ¹⁴⁸ _{Pm} , ^{148m} _{Pm}	
* ¹⁵⁰ _{Pm}	¹⁴⁷ _{Nd} , ¹⁴⁷ _{Pm} , ¹⁴⁸ _{Pm} , ^{148m} _{Pm} , * ¹⁴⁹ _{Pm}	
¹⁵¹ _{Sm}	¹⁵⁰ _{Sm}	
* ¹⁵³ _{Sm}	* ¹⁵² _{Sm}	
¹⁵⁴ _{Eu}	¹⁵³ _{Eu}	
¹⁵⁶ _{Eu}	¹⁵⁵ _{Eu}	

^a Only the listed presursors must be considered in determination of the neutron absorption effect, but cross sections must be included for all nuclides.

* Nuclides included in two-nuclide chains in CALEND code as of June 1978.

TABLE VII

BETA ENERGY RELEASED FROM FISSION-PRODUCT DECAY AFTER
20 000 h THERMAL IRRADIATION OF ^{235}U
(% difference between CINDER-10 and approximate method calculations)

Cooling Time(s)	Flux = $10^4 \text{ n/cm}^2\text{-s}$					
	Group 2 0.4-0.9 MeV	Group 4 1.35-1.8 MeV	Group 6 2.2-2.6 MeV	Group 8 3.0-4.0 MeV	Group 10 5.0-6.0 MeV	Total All Groups
1.0E-04	1.2	1.2	1.8	1.7	2.8	1.4
1.0E-01	1.2	1.1	1.6	1.5	2.5	1.3
1.0E+00	1.2	1.1	1.5	1.5	2.4	1.2
1.0E+01	1.4	1.1	1.5	1.3	3.5	1.2
1.0E+02	1.8	1.7	0.8	2.5	11.5	1.6
1.0E+03	2.1	1.7	0.9	3.6	4.1	1.7
1.0E+04	1.9	1.8	0.6	0.8	1.2	1.3
1.0E+05	2.2	1.5	1.6	- 0.3	0.5	1.5
1.0E+06	2.9	0.0	- 0.1	- 0.3	0.6	1.1
1.0E+07	2.7	0.0	0.1	0.0	3.1	0.2
1.0E+08	- 6.9	- 2.1	0.5	1.1	---	- 4.1
1.0E+09	- 0.7	0.4	0.5	3.5	---	- 0.1

fits could not be made as accurate as for the beta spectra fitted at two points per decade as shown in Table VIII, the comparison with CINDER-10 for the 20 000-h irradiation at $\phi = 10^4 \text{ n/cm}^2/\text{s}$ case is much better, as can be seen in Table IX. In general, the deviation is less than that for the pulse fit for a particular cooling time.

Comparison results for the case with a flux of $10^{14} \text{ n/cm}^2/\text{s}$, a case for which the effects of neutron absorption are very significant, are shown in Table X for the beta spectra and Table XI for the gamma spectra. As noted previously, only the "two-chain" reactions flagged with an * in Table VI were included in the CALENDa calculation. Note, however, from the total sum over the energy groups that most of the important absorption effects have been included for both the beta and gamma totals.

Some rather marked deviations of the approximate spectra from the CINDER-10 calculations can be seen for the individual beta and gamma spectra. For example, group 10 at 10^7 s , may indicate an inconsistency in the way missing spectra were constructed, but note that these large percentage differences are due to differences between very small numbers that contribute little to the total. Also note significant differences in some of the other groups for several cooling times, indicating a need for including additional two-nuclide chains.

It is interesting to compare spectral absorption effects graphically, that is, as a per cent deviation from the case without absorption, as was done in

TABLE VIII
MAXIMUM PER CENT GAMMAS DIFFERENCE

Group No.	Pulse		20 000-h Irr (10^4 flux)	
	Maximum % Dev	Cooling Time	Maximum % Dev	Cooling Time
1	3.8	4.0+7	-2.0	1.0+7
2	3.8	3.0+7	2.0	1.0+7
3	8.8	4.0+7	-1.8	1.0+7
4	13.5	2.0+5	3.1	5.0+5
5	2.1	1.0+9	-3.5	1.0+7
6	4.3	2.0+7	2.4	5.0+7
7	12.6	1.5+5	3.5	5.0+5
8	6.0	1.5+5	2.2	1.0+7
9	-2.1	1.0+7	3.6	1.0+7
10	-2.4	4.0+5	1.3	1.0+3
11	4.7	2.0+2	3.2	5.0+2

TABLE IX
GAMMA ENERGY RELEASED FROM FISSION PRODUCT DECAY AFTER
20 000-h THERMAL IRRADIATION OF ^{235}U
(% difference between CINDER-10 and approximate method calculations)

Flux = $10^4 \text{ n/cm}^2\text{-s}$

Cooling Time(s)	Group 2 0.4-0.9 MeV	Group 4 1.35-1.8 MeV	Group 6 2.2-2.6 MeV	Group 8 3.0-4.0 MeV	Group 10 5.0-6.0 MeV	Total All Groups
1.0E-04	- 0.1	0.1	0.2	0.4	0.3	0.1
1.0E-01	- 0.1	0.1	0.2	0.4	0.3	0.1
1.0E+00	- 0.2	0.1	0.2	0.4	0.4	0.1
1.0E+01	- 0.3	0.2	0.2	0.5	0.6	0.1
1.0E+02	- 0.3	0.2	0.3	0.7	0.9	0.1
1.0E+03	- 0.2	0.4	0.5	0.9	1.3	0.1
1.0E+04	0.0	0.9	0.8	1.4	- 0.6	0.2
1.0E+05	0.4	1.7	- 0.5	0.3	0.4	0.5
1.0E+06	0.6	2.3	- 1.9	- 0.8	- 0.7	0.9
1.0E+07	2.0	- 1.3	1.1	2.2	1.1	1.8
1.0E+08	- 0.6	- 0.4	1.4	- 0.4	---	- 0.6
1.0E+09	- 0.3	1.7	0.6	0.5	---	- 0.3

TABLE X

BETA ENERGY RELEASED FROM FISSION PRODUCT DECAY AFTER
20 000 h THERMAL IRRADIATION OF ^{235}U
(% difference between CINDER-10 and approximate method calculations)

Cooling Time(s)	Flux = 10^{14} n/cm ² -s					Total All Groups
	Group 2 0.4-0.9 MeV	Group 4 1.35-1.8 MeV	Group 6 2.2-2.6 MeV	Group 8 3.0-4.0 MeV	Group 10 5.0-6.0 MeV	
1.0E-04	4.5	3.8	3.2	2.9	3.4	3.4
1.0E-01	4.5	3.7	3.0	2.7	3.0	3.3
1.0E+00	4.5	3.7	2.9	2.8	3.1	3.3
1.0E+01	4.7	3.7	3.0	2.7	4.7	3.4
1.0E+02	4.5	2.9	1.2	2.8	13.1	3.0
1.0E+03	5.3	3.0	1.4	4.3	4.7	3.7
1.0E+04	6.5	4.4	1.6	1.1	1.5	4.7
1.0E+05	7.6	7.5	3.7	4.9	4.8	6.3
1.0E+06	5.1	5.1	0.9	- 0.1	0.7	3.7
1.0E+07	3.3	0.7	0.6	0.1	318.3	0.9
1.0E+08	- 5.1	- 1.4	0.8	0.8	---	- 2.6
1.0E+09	0.2	0.7	0.7	5.6	---	0.1

TABLE XI

GAMMA ENERGY RELEASED FROM FISSION PRODUCT DECAY AFTER
20 000 h THERMAL IRRADIATION OF ^{235}U
(% difference between CINDER-10 and approximate method calculations)

Cooling Time(s)	Flux = 10^{14} n/cm ² -s					Total All Groups
	Group 2 0.4-0.9 MeV	Group 4 1.35-1.8 MeV	Group 6 2.2-2.6 MeV	Group 8 3.0-4.0 MeV	Group 10 5.0-6.0 MeV	
1.0E-04	0.6	0.6	0.4	0.5	0.4	0.9
1.0E-01	0.6	0.6	0.4	0.5	0.4	0.9
1.0E+00	0.7	0.7	0.5	0.5	0.5	1.0
1.0E+01	0.8	0.8	0.5	0.6	0.6	1.1
1.0E+02	1.0	1.0	0.6	0.7	0.9	1.5
1.0E+03	1.3	1.4	1.0	1.0	3.4	2.1
1.0E+04	1.5	2.5	2.1	1.7	56.4	3.1
1.0E+05	1.2	3.6	5.5	4.7	60.1	3.7
1.0E+06	2.1	3.0	4.0	2.5	84.1	6.1
1.0E+07	1.0	- 2.3	13.3	10.0	1161.4	1.0
1.0E+08	- 0.6	- 2.8	- 7.2	- 8.7	---	- 0.8
1.0E+09	2.0	17.1	0.4	0.1	---	2.0

Figs. 27-29. The comparisons for groups 1 and 2 of the beta spectra are shown in Figs. 30 and 31; and groups 1, 2, 4, 5, of the gamma spectra are shown in Figs. 32-35, respectively. Figure 36 shows the comparison for the total beta release summed over all groups, and, finally, Fig. 37 gives the same for the gammas. In all figures, the solid curve is the approximate CALENDa calculation and the open circles are from CINDER-10. The large peaks at about 10^8 s cooling time occurring in beta groups 1 and 2 and in gamma group 2 are due to the $^{133}\text{Cs}(n,\gamma)^{134}\text{Cs}$ reaction. The very large peaks in gamma groups 3 and 4 are also due to this reaction, but the large percentage differences seen are again due to differences in small numbers, as practically all of the gamma energy is contained in group 2. This is evident from Fig. 37, which shows that the sum over all the groups in this cooling-time domain is about the same as for group 2. Figure 32 for group 1 gammas shows the negative effects of the ^{135}Xe .

A large deviation of about 400% near a cooling time of 10^6 s is seen in group 5 (Fig. 35) for the CINDER-10 calculation that is not accounted for in the approximate method. The precursor of the missing reaction would probably have a half-life of about 1.5×10^6 s, and the product nuclide would emit relatively strong gammas in the energy region from 1.8 to 2.2 MeV. As indicated by the other figures, additional reactions could be included to increase the accuracy of the approximate method.

VI. SUMMARY

The results of the pulse calculations (10^{-4} s irradiation time) from the CINDER-10 code have been collected and organized into a library of aggregate fission-product release-energy spectra on a fine multigroup energy mesh. These data are given for cooling times from 10^{-4} to 10^{13} s at two steps per time decade. This library of processed ENDF/B-IV fission product yield and decay data (PEFPYD) contains spectral data for all ten yield sets given in ENDF/B-IV and is organized in an ENDF-like format. The library can be obtained from the National Nuclear Data Center (NNDC) at Brookhaven National Library (BNL).

A method has been developed for using the PEFYD data in approximate calculations of fission-product decay-energy spectra resulting from nuclear fuels irradiated for a finite time. The pulse data is first collapsed to a coarse-group structure and the decay-energy vs cooling-time data points of the resulting broad groups are fit with a sum of exponentials. This is done with the FITPULS code, which contains a nonlinear least-squares routine for making the fits.

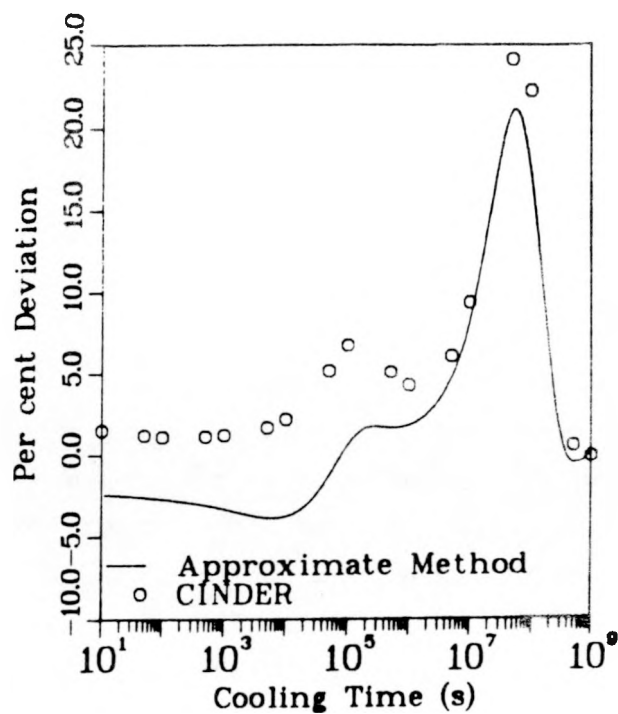


Fig. 30.
Per cent deviation due to absorption
for group 1 betas.

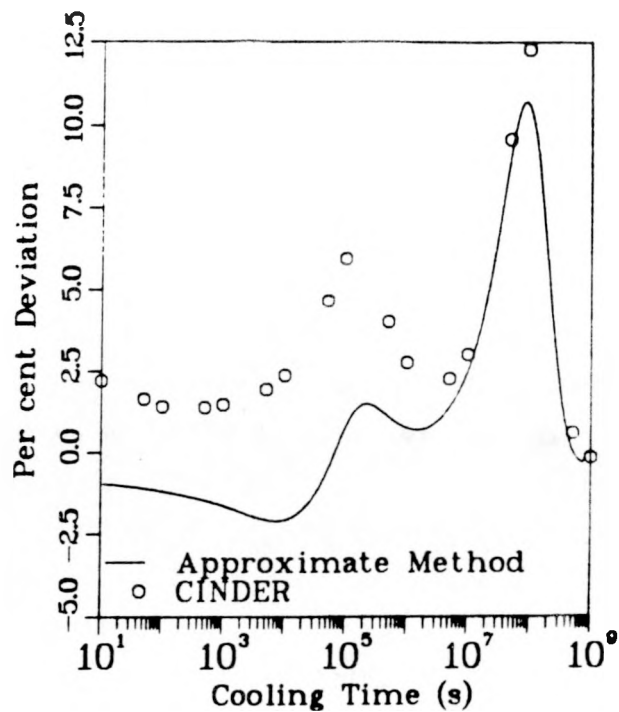


Fig. 31.
Per cent deviation due to absorption
for group 2 betas.

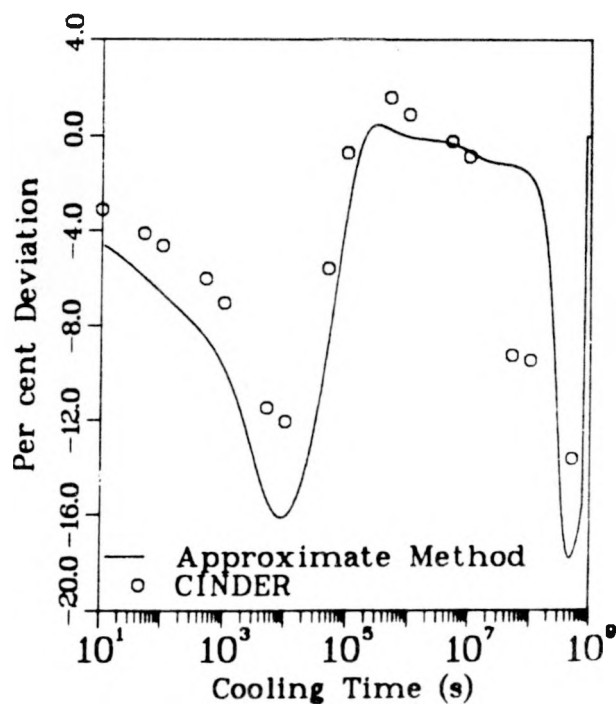


Fig. 32.
Per cent deviation due to absorption
for group 1 gammas.

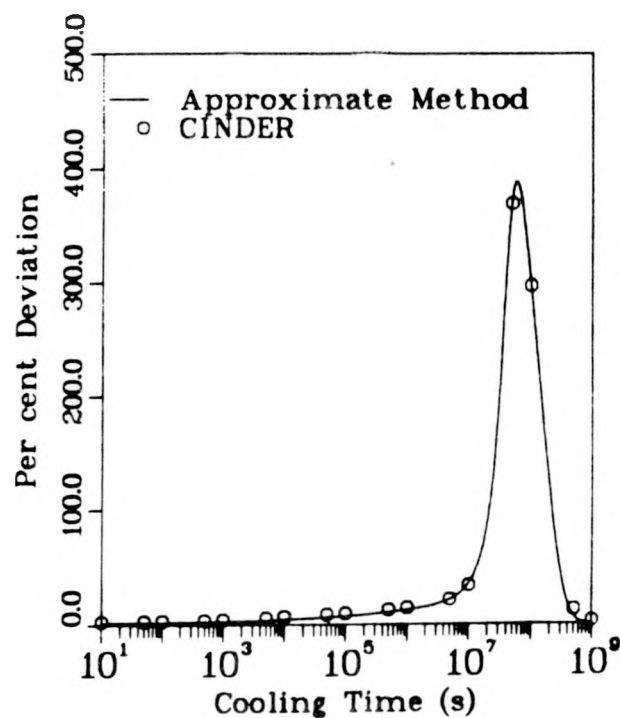


Fig. 33.
Per cent deviation due to absorption
for group 2 gammas.

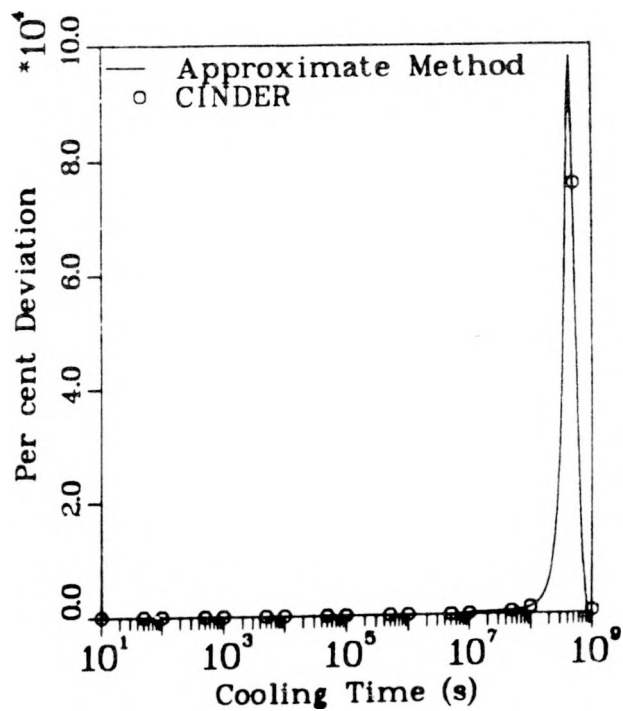


Fig. 34.
Per cent deviation due to absorption
for group 4 gammas.

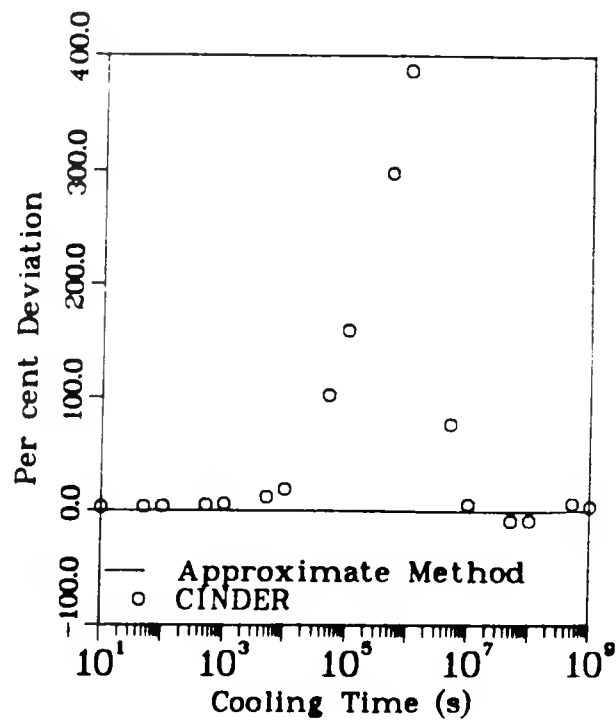


Fig. 35.
Per cent deviation due to absorption
for group 5 gammas.

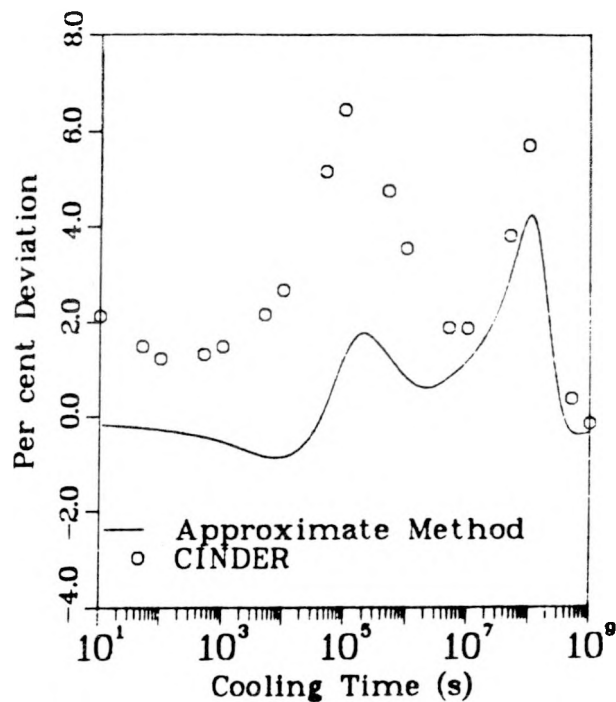


Fig. 36.
Per cent deviation due to absorption,
total betas.

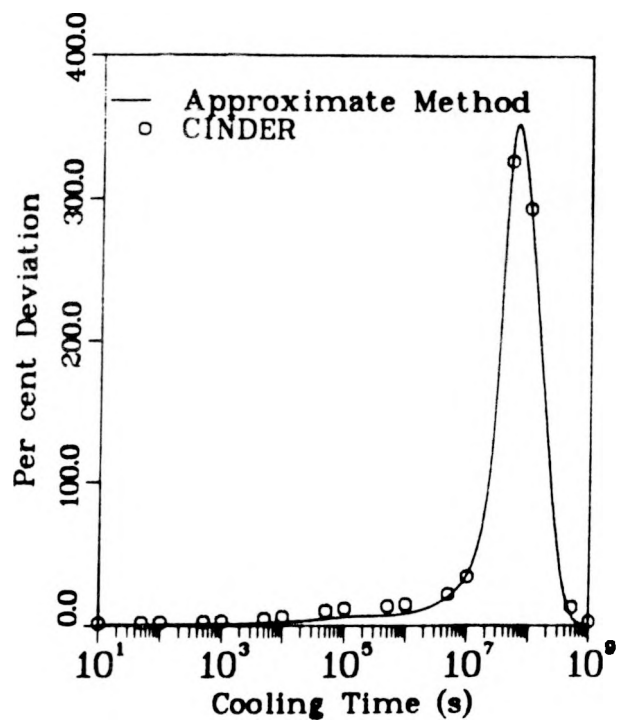


Fig. 37.
Per cent deviation due to absorption,
total gammas.

It is also worth noticing that FITPULS has the option of reducing data for a finite irradiation time to a pulse. This option, which is not discussed in this report, is useful for comparing different experiments run with different irradiation times.

Finally, broad-group spectra for finite irradiation times can be generated by simply folding the irradiation time into the analytic fits for the pulse spectra. This is done using the CALEND code, which also has an option for including the effects of neutron absorption by approximating the more important reactions with two-nuclide chains. Given the fits for the pulse groups, the CALEND calculation is very rapid, and thus the method provides an inexpensive way of calculating fission-product decay-energy spectra for a variety of problems. Such a set of useful pulse fits are provided in this report.

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APPENDIX A

SAMPLE PEFPHYD-LIB LISTING

U-233 (MAT 1460) THERMAL				850-0 -0	-0			
9.2233E+04	2.3104E+02	0	0	0	01260 1451	1		
U	0	0	0	0	01260 1451	2		
U	0	0	0	6	131260 1451	3		
92 U 233 LASL PROCESSED MARCH 78, R.J. LABAUVE, D.C. GEORGE					1260 1451	4		
THERMAL BURST					1260 1451	5		
					1260 1451	6		
U-233 FISSION PRODUCT DECAY SPECTRA PROCESSED FROM ENUF/B-IV					1260 1451	7		
IN 150 ENERGY GROUPS					1260 1451	8		
					1260 1451	9		
				1	451	22	1260 1451	10
				80	801	1202	1260 1451	11
				80	802	1208	1260 1451	12
				80	803	1029	1260 1451	13
				80	811	866	1260 1451	14
				80	812	858	1260 1451	15
				80	813	750	1260 1451	16
				80	821	793	1260 1451	17
				80	822	725	1260 1451	18
				80	823	705	1260 1451	19
				80	831	816	1260 1451	20
				80	832	817	1260 1451	21
				80	833	711	1260 1451	22
							1260 1 0	23
							1260 0 0	24
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24	0	0	0	0	0126080801	27		
0.	0.	0	0	1	151126080801	28		
151	1	0	0	0	0126080801	29		
0.00000+	0 3.52841-	9 5.00000-	2 3.22830-	8 1.00000-	1 1.59743-	6126080801	30	
1.50000+	1 1.429132-	7 2.00000-	1 2.00277-	7 2.50000-	1 5.24900-	7126080801	31	
3.00000+	1 1.46303-	7 3.50000-	1 5.16394-	7 4.00000-	1 4.57273-	7126080801	32	
4.50000+	1 1.79141-	6 5.00000-	1 3.13850-	6 5.50000-	1 2.24957-	6126080801	33	
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7.50000+	1 4.02570-	7 8.00000-	1 8.84510-	6 8.50000-	1 3.83292-	7126080801	35	
9.00000+	1 4.53775-	7 9.50000-	1 7.17263-	7 1.00000+	0 4.42816-	7126080801	36	
1.05000+	0 5.85547-	7 1.10000+	0 1.16717-	6 1.15000+	0 4.29534-	7126080801	37	
1.20000+	0 1.46699-	6 1.25000+	0 9.80709-	7 1.30000+	0 1.04599-	6126080801	38	
1.35000+	0 6.24308-	7 1.40000+	0 1.37299-	6 1.45000+	0 7.48766-	7126080801	39	
1.50000+	0 8.40361-	7 1.55000+	0 7.56328-	7 1.60000+	0 6.60022-	7126080801	40	
1.65000+	0 6.75008-	7 1.70000+	0 7.09880-	7 1.75000+	0 8.13122-	7126080801	41	
1.80000+	0 6.81674-	7 1.85000+	0 7.67507-	7 1.90000+	0 7.07847-	7126080801	42	
1.95000+	0 8.24278-	7 2.00000+	0 7.69455-	7 2.05000+	0 7.30857-	7126080801	43	
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3.45000+	0 5.03448-	7 3.50000+	0 5.11400-	7 3.55000+	0 5.72931-	7126080801	53	
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3.75000+	0 4.14150-	7 3.80000+	0 4.19857-	7 3.85000+	0 3.61260-	7126080801	55	
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4.20000+	0 2.65225-	7 4.25000+	0 5.97022-	7 4.30000+	0 2.32238-	7126080801	58	
4.35000+	0 2.50161-	7 4.40000+	0 2.34531-	7 4.45000+	0 2.08048-	7126080801	59	
4.50000+	0 2.02252-	7 4.55000+	0 7.78017-	7 4.60000+	0 2.25345-	7126080801	60	
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4.95000+	0 1.37519-	7 5.00000+	0 7.32094-	7 5.05000+	0 1.48632-	7126080801	63	

5.100000	0	1.24321-	7	5.150000	0	1.83454-	7	5.200000	0	1.68142-	7126080801	64
5.250000	0	1.13945-	7	5.300000	0	1.300000	7	5.350000	0	1.14694-	7126080801	65
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1.350000	0	5.58925-	7	1.400000	0	1.25544-	6	1.450000	0	6.77143-	7126080801	92
1.500000	0	7.59974-	7	1.550000	0	6.81808-	7	1.600000	0	5.94550-	7126080801	93
1.650000	0	6.06114-	7	1.700000	0	6.36427-	7	1.750000	0	7.31142-	7126080801	94
1.800000	0	6.10313-	7	1.850000	0	6.86816-	7	1.900000	0	6.33232-	7126080801	95
1.950000	0	7.40153-	7	2.000000	0	6.87471-	7	2.050000	0	6.51542-	7126080801	96
2.100000	0	7.08404-	7	2.150000	0	6.54307-	7	2.200000	0	6.91507-	7126080801	97
2.250000	0	7.14390-	7	2.300000	0	7.30416-	7	2.350000	0	6.73448-	7126080801	98
2.400000	0	7.25535-	7	2.450000	0	9.02309-	7	2.500000	0	7.23584-	7126080801	99
2.550000	0	8.87761-	7	2.600000	0	7.17190-	7	2.650000	0	6.49278-	7126080801	100
2.700000	0	8.65183-	7	2.750000	0	7.29565-	7	2.800000	0	7.05763-	7126080801	101
2.850000	0	7.10765-	7	2.900000	0	6.54981-	7	2.950000	0	5.86755-	7126080801	102
3.000000	0	5.81519-	7	3.050000	0	5.75780-	7	3.100000	0	5.81924-	7126080801	103
3.150000	0	5.46665-	7	3.200000	0	5.19562-	7	3.250000	0	5.07102-	7126080801	104
3.300000	0	5.01930-	7	3.350000	0	5.08229-	7	3.400000	0	4.90539-	7126080801	105
3.450000	0	4.45334-	7	3.500000	0	4.53335-	7	3.550000	0	6.06356-	7126080801	106
3.600000	0	4.45248-	7	3.650000	0	3.88178-	7	3.700000	0	3.85434-	7126080801	107
3.750000	0	3.65849-	7	3.800000	0	3.72864-	7	3.850000	0	3.19040-	7126080801	108
3.900000	0	3.12778-	7	3.950000	0	2.94852-	7	4.000000	0	2.78479-	7126080801	109
4.050000	0	3.57605-	7	4.100000	0	3.41649-	7	4.150000	0	2.39684-	7126080801	110
4.200000	0	2.34814-	7	4.250000	0	2.65876-	7	4.300000	0	2.05834-	7126080801	111
4.350000	0	2.27058-	7	4.400000	0	2.08020-	7	4.450000	0	1.85383-	7126080801	112
4.500000	0	1.77894-	7	4.550000	0	1.58354-	7	4.600000	0	2.01107-	7126080801	113
4.650000	0	1.44771-	7	4.700000	0	1.37300-	7	4.750000	0	1.35201-	7126080801	114
4.800000	0	1.72003-	7	4.850000	0	1.27419-	7	4.900000	0	1.46036-	7126080801	115
4.950000	0	1.22569-	7	5.000000	0	1.17626-	7	5.050000	0	1.32343-	7126080801	116
5.100000	0	1.10689-	7	5.150000	0	1.63524-	7	5.200000	0	1.49543-	7126080801	117
5.250000	0	1.01508-	7	5.300000	0	1.16525-	7	5.350000	0	1.06498-	7126080801	118
5.400000	0	1.02971-	7	5.450000	0	1.05369-	7	5.500000	0	9.30944-	8126080801	119
5.550000	0	1.36378-	7	5.600000	0	1.22046-	7	5.650000	0	7.49731-	8126080801	120
5.700000	0	8.80978-	8	5.750000	0	6.93523-	8	5.800000	0	6.66790-	8126080801	121
5.850000	0	8.04595-	8	5.900000	0	8.35016-	8	5.950000	0	5.92657-	8126080801	122
6.000000	0	9.04858-	8	6.050000	0	5.47146-	8	6.100000	0	7.27049-	8126080801	123
6.150000	0	5.01629-	8	6.200000	0	5.11212-	8	6.250000	0	4.55597-	8126080801	124
6.300000	0	4.32583-	8	6.350000	0	4.09564-	8	6.400000	0	3.86528-	8126080801	125
6.450000	0	3.63701-	8	6.500000	0	3.40807-	8	6.550000	0	3.18339-	8126080801	126
6.600000	0	2.96220-	8	6.650000	0	2.74348-	8	6.700000	0	2.52832-	8126080801	127
6.750000	0	2.31902-	8	6.800000	0	2.11409-	8	6.850000	0	1.91540-	8126080801	128
6.900000	0	1.72328-	8	6.950000	0	1.53840-	8	7.000000	0	1.36197-	8126080801	129
7.050000	0	1.19424-	8	7.100000	0	1.03387-	8	7.150000	0	8.88554-	9126080801	130
7.200000	0	7.52338-	9	7.250000	0	6.28258-	9	7.300000	0	5.17476-	9126080801	131
7.350000	0	4.20781-	9	7.400000	0	3.38746-	9	7.450000	0	2.72853-	9126080801	132

7.500000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	0126080801	133
0.		5.000000	-01	0	0	0	0	1	151126080801			134
	151		1	0	0	0	0	0	0126080801			135
0.000000	0	2.63071-	9	5.000000	-2	2.47022-	8	1.000000	-1	7.81174-	7126080801	136
1.500000	-1	4.11359-	8	2.000000	-1	1.42424-	7	2.500000	-1	3.71510-	7126080801	137
3.000000	-1	4.83981-	8	3.500000	-1	3.62260-	7	4.000000	-1	2.78953-	7126080801	138
4.500000	-1	1.02792-	6	5.000000	-1	1.93354-	6	5.500000	-1	1.29272-	6126080801	139
6.000000	-1	1.12655-	7	6.500000	-1	2.05551-	7	7.000000	-1	3.49458-	7126080801	140
7.500000	-1	2.79559-	7	8.000000	-1	4.18424-	6	8.500000	-1	2.53794-	7126080801	141
9.000000	-1	3.23443-	7	9.500000	-1	4.92805-	7	1.000000	0	2.89703-	7126080801	142
1.050000	0	3.48011-	7	1.100000	0	6.02091-	7	1.150000	0	2.86120-	7126080801	143
1.200000	0	8.08981-	7	1.250000	0	6.51911-	7	1.300000	0	7.26538-	7126080801	144
1.350000	0	4.03648-	7	1.400000	0	9.75694-	7	1.450000	0	5.04917-	7126080801	145
1.500000	0	5.66813-	7	1.550000	0	5.02420-	7	1.600000	0	4.35995-	7126080801	146
1.650000	0	4.40911-	7	1.700000	0	4.60458-	7	1.750000	0	5.34549-	7126080801	147
1.800000	0	4.39172-	7	1.850000	0	4.93761-	7	1.900000	0	4.54248-	7126080801	148
1.950000	0	5.38394-	7	2.000000	0	4.92727-	7	2.050000	0	4.61637-	7126080801	149
2.100000	0	5.07479-	7	2.150000	0	4.63842-	7	2.200000	0	4.92530-	7126080801	150
2.250000	0	5.10027-	7	2.300000	0	5.23134-	7	2.350000	0	4.74446-	7126080801	151
2.400000	0	5.13710-	7	2.450000	0	6.32514-	7	2.500000	0	5.15984-	7126080801	152
2.550000	0	6.51948-	7	2.600000	0	5.09995-	7	2.650000	0	4.53874-	7126080801	153
2.700000	0	0.07957-	7	2.750000	0	5.17803-	7	2.800000	0	4.90420-	7126080801	154
2.850000	0	5.03331-	7	2.900000	0	4.60518-	7	2.950000	0	4.05879-	7126080801	155
3.000000	0	4.03010-	7	3.050000	0	3.97749-	7	3.100000	0	4.03107-	7126080801	156
3.150000	0	3.74443-	7	3.200000	0	3.57803-	7	3.250000	0	3.44476-	7126080801	157
3.300000	0	3.46412-	7	3.350000	0	3.55180-	7	3.400000	0	3.41514-	7126080801	158
3.450000	0	3.05710-	7	3.500000	0	3.14559-	7	3.550000	0	4.45890-	7126080801	159
3.600000	0	3.12349-	7	3.650000	0	2.65416-	7	3.700000	0	2.66305-	7126080801	160
3.750000	0	2.53515-	7	3.800000	0	2.60270-	7	3.850000	0	2.18023-	7126080801	161
3.900000	0	2.15051-	7	3.950000	0	1.12258-	7	4.000000	0	1.90847-	7126080801	162
4.050000	0	2.59938-	7	4.100000	0	5.48693-	7	4.150000	0	1.65216-	7126080801	163
4.200000	0	1.02264-	7	4.250000	0	1.91800-	7	4.300000	0	1.43424-	7126080801	164
4.350000	0	1.02265-	7	4.400000	0	1.40022-	7	4.450000	0	1.31976-	7126080801	165
4.500000	0	1.27368-	7	4.550000	0	1.12258-	7	4.600000	0	1.44314-	7126080801	166
4.650000	0	1.03180-	7	4.700000	0	9.94552-	8	4.750000	0	9.66990-	8126080801	167
4.800000	0	1.22519-	7	4.850000	0	9.13387-	8	4.900000	0	1.04048-	7126080801	168
4.950000	0	8.76978-	8	5.000000	0	8.39033-	8	5.050000	0	9.43336-	8126080801	169
5.100000	0	7.89059-	8	5.150000	0	1.16459-	7	5.200000	0	1.06106-	7126080801	170
5.250000	0	7.25074-	8	5.300000	0	8.31927-	8	5.350000	0	7.57192-	8126080801	171
5.400000	0	7.51120-	8	5.450000	0	7.48414-	8	5.500000	0	6.75483-	8126080801	172
5.550000	0	9.66006-	8	5.600000	0	8.68436-	8	5.650000	0	5.32884-	8126080801	173
5.700000	0	6.24912-	8	5.750000	0	4.92499-	8	5.800000	0	4.73248-	8126080801	174
5.850000	0	5.69817-	8	5.900000	0	5.90706-	8	5.950000	0	4.19484-	8126080801	175
6.000000	0	5.38761-	8	6.050000	0	3.86347-	8	6.100000	0	5.12524-	8126080801	176
6.150000	0	3.53331-	8	6.200000	0	3.64562-	8	6.250000	0	3.19966-	8126080801	177
6.300000	0	3.03333-	8	6.350000	0	2.85708-	8	6.400000	0	2.70078-	8126080801	178
6.450000	0	2.53607-	8	6.500000	0	5.37110-	8	6.550000	0	2.20914-	8126080801	179
6.600000	0	2.05022-	8	6.650000	0	1.89296-	8	6.700000	0	1.73852-	8126080801	180
6.750000	0	1.58779-	8	6.800000	0	1.44168-	8	6.850000	0	1.29982-	8126080801	181
6.900000	0	1.16249-	8	6.950000	0	1.03078-	8	7.000000	0	9.05254-	9126080801	182
7.050000	0	1.86258-	9	7.100000	0	6.74297-	9	7.150000	0	5.70479-	9126080801	183
7.200000	0	4.74928-	9	7.250000	0	3.88349-	9	7.300000	0	3.11546-	9126080801	184
7.350000	0	2.45098-	9	7.400000	0	1.89511-	9	7.450000	0	1.45745-	9126080801	185
7.500000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	0126080801	186
0.		1.000000	+00	0	0	0	0	1	151126080801			187
	151		1	0	0	0	0	0	0126080801			188
0.000000	0	2.26492-	9	5.000000	-2	2.15502-	8	1.000000	-1	4.84493-	7126080801	189
1.500000	-1	1.58923-	8	2.000000	-1	1.18797-	7	2.500000	-1	3.05972-	7126080801	190
3.000000	-1	1.79345-	8	3.500000	-1	2.97594-	7	4.000000	-1	2.12042-	7126080801	191
4.500000	-1	7.47052-	7	5.000000	-1	1.46985-	6	5.500000	-1	9.40471-	7126080801	192
6.000000	-1	5.83778-	7	6.500000	-1	7.69459-	7	7.000000	-1	2.86716-	7126080801	193
7.500000	-1	2.28526-	7	8.000000	-1	2.49908-	6	8.500000	-1	2.02954-	7126080801	194
9.000000	-1	2.05891-	7	9.500000	-1	4.00354-	7	1.000000	0	2.29798-	7126080801	195
1.050000	0	4.21108-	7	1.100000	0	6.53582-	7	1.150000	0	2.28254-	7126080801	196
1.200000	0	5.73030-	7	1.250000	0	5.17760-	7	1.300000	0	5.97338-	7126080801	197
1.350000	0	3.16793-	7	1.400000	0	8.11975-	7	1.450000	0	4.05573-	7126080801	198
1.500000	0	4.55503-	7	1.550000	0	4.00287-	7	1.600000	0	3.45307-	7126080801	199
1.650000	0	3.46689-	7	1.700000	0	3.60276-	7	1.750000	0	4.22214-	7126080801	200
1.800000	0	3.41701-	7	1.850000	0	3.84276-	7	1.900000	0	3.52331-	7126080801	201

1.950000+	0	4.23325-	7	2.000000+	0	3.81795-	7	2.050000+	0	3.53806-	7126080801	202
2.100000+	0	3.93804-	7	2.150000+	0	3.55441-	7	2.200000+	0	3.79108-	7126080801	203
2.250000+	0	3.93734-	7	2.300000+	0	4.04243-	7	2.350000+	0	3.61324-	7126080801	204
2.400000+	0	3.93488-	7	2.450000+	0	4.81048-	7	2.500000+	0	3.97479-	7126080801	205
2.550000+	0	5.15620-	7	2.600000+	0	3.91242-	7	2.650000+	0	3.42508-	7126080801	206
2.700000+	0	4.04253-	7	2.750000+	0	3.97334-	7	2.800000+	0	3.68800-	7126080801	207
2.850000+	0	3.89169-	7	2.900000+	0	3.49909-	7	2.950000+	0	3.03171-	7126080801	208
3.000000+	0	3.01567-	7	3.050000+	0	2.96055-	7	3.100000+	0	3.01729-	7126080801	209
3.150000+	0	2.17193-	7	3.200000+	0	2.65702-	7	3.250000+	0	2.55193-	7126080801	210
3.300000+	0	2.58275-	7	3.350000+	0	2.68215-	7	3.400000+	0	2.56780-	7126080801	211
3.450000+	0	2.26613-	7	3.500000+	0	2.35014-	7	3.550000+	0	3.53006-	7126080801	212
3.600000+	0	2.30872-	7	3.650000+	0	1.95900-	7	3.700000+	0	1.99009-	7126080801	213
3.750000+	0	1.89506-	7	3.800000+	0	1.96059-	7	3.850000+	0	1.61209-	7126080801	214
3.900000+	0	1.00147-	7	3.950000+	0	1.50372-	7	4.000000+	0	1.41810-	7126080801	215
4.050000+	0	2.04587-	7	4.100000+	0	1.96194-	7	4.150000+	0	1.23773-	7126080801	216
4.200000+	0	1.22564-	7	4.250000+	0	1.50247-	7	4.300000+	0	1.08877-	7126080801	217
4.350000+	0	1.27949-	7	4.400000+	0	1.11911-	7	4.450000+	0	1.02506-	7126080801	218
4.500000+	0	9.05953-	8	4.550000+	0	8.71000-	8	4.600000+	0	1.13205-	7126080801	219
4.650000+	0	8.05929-	8	4.700000+	0	7.78551-	8	4.750000+	0	7.58134-	8126080801	220
4.800000+	0	9.50352-	8	4.850000+	0	7.15447-	8	4.900000+	0	8.12500-	8126080801	221
4.950000+	0	6.88224-	8	5.000000+	0	6.50073-	8	5.050000+	0	7.37341-	8126080801	222
5.100000+	0	6.17259-	8	5.150000+	0	9.10173-	8	5.200000+	0	8.26073-	8126080801	223
5.250000+	0	5.08298-	8	5.300000+	0	6.51236-	8	5.350000+	0	5.90040-	8126080801	224
5.400000+	0	5.99468-	8	5.450000+	0	5.83105-	8	5.500000+	0	5.36706-	8126080801	225
5.550000+	0	7.49781-	8	5.600000+	0	6.74761-	8	5.650000+	0	4.15891-	8126080801	226
5.700000+	0	4.86349-	8	5.750000+	0	3.84118-	8	5.800000+	0	3.64935-	8126080801	227
5.850000+	0	4.42823-	8	5.900000+	0	4.58454-	8	5.950000+	0	3.26280-	8126080801	228
6.000000+	0	4.94515-	8	6.050000+	0	2.99906-	8	6.100000+	0	3.96502-	8126080801	229
6.150000+	0	2.13685-	8	6.200000+	0	2.85558-	8	6.250000+	0	2.47253-	8126080801	230
6.300000+	0	2.34107-	8	6.350000+	0	2.20964-	8	6.400000+	0	2.07825-	8126080801	231
6.450000+	0	1.94814-	8	6.500000+	0	1.81798-	8	6.550000+	0	1.69027-	8126080801	232
6.600000+	0	1.26504-	8	6.650000+	0	1.44118-	8	6.700000+	0	1.31959-	8126080801	233
6.750000+	0	1.20120-	8	6.800000+	0	1.08051-	8	6.850000+	0	9.75117-	9126080801	234
6.900000+	0	8.67737-	9	6.950000+	0	7.64753-	9	7.000000+	0	6.66728-	9126080801	235
7.050000+	0	5.14013-	9	7.100000+	0	4.87027-	9	7.150000+	0	4.06578-	9126080801	236
7.200000+	0	3.52824-	9	7.250000+	0	2.60248-	9	7.300000+	0	2.07570-	9126080801	237
7.350000+	0	1.07180-	9	7.400000+	0	1.15224-	9	7.450000+	0	8.33118-	10126080801	238
7.500000+	0	0.00000+	0	0.000000+	0	0.000000+	0	0.000000+	0	0.000000+	0126080801	239
0.	151	5.00000E+00	0	0	0	0	0	1	151	126080801	240	
0.000000+	0	1.46296-	9	5.000000+	2	1.38114-	8	1.000000+	1	9.15756-	8126080801	241
1.500000+	1	4.20038-	8	2.000000+	1	6.67362-	8	2.500000+	1	1.51346-	7126080801	242
3.000000+	1	4.44173-	8	3.500000+	1	1.49039-	7	4.000000+	1	8.69296-	8126080801	243
4.500000+	1	2.40987-	7	5.000000+	1	5.54634-	7	5.500000+	1	3.04274-	7126080801	244
6.000000+	1	2.94221-	7	6.500000+	1	9.33619-	8	7.000000+	1	1.49500-	7126080801	245
7.500000+	1	1.16736-	7	8.000000+	1	3.52332-	7	8.500000+	1	1.04405-	7126080801	246
9.000000+	1	1.43014-	7	9.500000+	1	1.99142-	7	1.000000+	0	1.15039-	7126080801	247
1.050000+	0	1.57738-	7	1.100000+	0	3.41132-	7	1.150000+	0	1.12787-	7126080801	248
1.200000+	0	2.05321-	7	1.250000+	0	2.34061-	7	1.300000+	0	3.26415-	7126080801	249
1.350000+	0	1.51108-	7	1.400000+	0	4.55466-	7	1.450000+	0	2.01683-	7126080801	250
1.500000+	0	2.26325-	7	1.550000+	0	1.93334-	7	1.600000+	0	1.66034-	7126080801	251
1.650000+	0	1.92419-	7	1.700000+	0	1.64604-	7	1.750000+	0	1.99717-	7126080801	252
1.800000+	0	1.55798-	7	1.850000+	0	1.73723-	7	1.900000+	0	1.56775-	7126080801	253
1.950000+	0	1.94278-	7	2.000000+	0	1.69792-	7	2.050000+	0	1.50396-	7126080801	254
2.100000+	0	1.14942-	7	2.150000+	0	1.50933-	7	2.200000+	0	1.63721-	7126080801	255
2.250000+	0	1.72893-	7	2.300000+	0	1.79599-	7	2.350000+	0	1.49526-	7126080801	256
2.400000+	0	1.07821-	7	2.450000+	0	1.95726-	7	2.500000+	0	1.73091-	7126080801	257
2.550000+	0	2.50043-	7	2.600000+	0	1.60860-	7	2.650000+	0	1.36949-	7126080801	258
2.700000+	0	1.92269-	7	2.750000+	0	1.72207-	7	2.800000+	0	1.45026-	7126080801	259
2.850000+	0	1.07176-	7	2.900000+	0	1.45089-	7	2.950000+	0	1.17078-	7126080801	260
3.000000+	0	1.17592-	7	3.050000+	0	1.15113-	7	3.100000+	0	1.14337-	7126080801	261
3.150000+	0	1.04262-	7	3.200000+	0	1.01177-	7	3.250000+	0	9.61246-	8126080801	262
3.300000+	0	1.00912-	7	3.350000+	0	1.11170-	7	3.400000+	0	1.03894-	7126080801	263
3.450000+	0	8.00818-	8	3.500000+	0	9.47013-	8	3.550000+	0	1.76015-	7126080801	264
3.600000+	0	9.46700-	8	3.650000+	0	7.30367-	8	3.700000+	0	7.86706-	8126080801	265
3.750000+	0	7.48733-	8	3.800000+	0	8.12789-	8	3.850000+	0	6.05057-	8126080801	266
3.900000+	0	6.19209-	8	3.950000+	0	5.75163-	8	4.000000+	0	5.39557-	8126080801	267
4.050000+	0	9.84064-	8	4.100000+	0	9.55064-	8	4.150000+	0	4.83740-	8126080801	268
4.200000+	0	4.88952-	8	4.250000+	0	7.03755-	8	4.300000+	0	4.46143-	8126080801	269

4.350000	0	6.17321-	8	4.400000	0	4.68311-	8	4.450000	0	4.57473-	8	8126080801	271
4.500000	0	4.25203-	8	4.550000	0	3.810000	8	4.600000	0	5.15210-	8	8126080801	272
4.650000	0	3.60154-	8	4.700000	0	3.50054-	8	4.750000	0	3.42300-	8	8126080801	273
4.800000	0	4.19498-	8	4.850000	0	3.21769-	8	4.900000	0	3.58711-	8	8126080801	274
4.950000	0	3.12166-	8	5.000000	0	2.94177-	8	5.050000	0	3.25737-	8	8126080801	275
5.100000	0	2.75927-	8	5.150000	0	4.07317-	8	5.200000	0	3.55741-	8	8126080801	276
5.250000	0	2.56135-	8	5.300000	0	2.90264-	8	5.350000	0	2.59001-	8	8126080801	277
5.400000	0	2.92285-	8	5.450000	0	2.53801-	8	5.500000	0	2.58807-	8	8126080801	278
5.550000	0	3.17626-	8	5.600000	0	3.87013-	8	5.650000	0	1.83775-	8	8126080801	279
5.700000	0	2.10723-	8	5.750000	0	1.69412-	8	5.800000	0	1.62310-	8	8126080801	280
5.850000	0	1.90803-	8	5.900000	0	1.96051-	8	5.950000	0	1.42875-	8	8126080801	281
6.000000	0	2.08499-	8	6.050000	0	1.30738-	8	6.100000	0	1.64135-	8	8126080801	282
6.150000	0	1.18780-	8	6.200000	0	1.30729-	8	6.250000	0	1.06821-	8	8126080801	283
6.300000	0	1.00393-	8	6.350000	0	9.49786-	9	6.400000	0	8.90746-	9	9126080801	284
6.450000	0	8.32324-	9	6.500000	0	7.73391-	9	6.550000	0	7.15846-	9	9126080801	285
6.600000	0	6.60870-	9	6.650000	0	6.00374-	9	6.700000	0	5.51459-	9	9126080801	286
6.750000	0	4.98818-	9	6.800000	0	4.47877-	9	6.850000	0	3.98505-	9	9126080801	287
6.900000	0	3.51146-	9	6.950000	0	3.00797-	9	7.000000	0	2.62775-	9	9126080801	288
7.050000	0	2.22250-	9	7.100000	0	7.100000	9	7.150000	0	1.49875-	9	9126080801	289
7.200000	0	1.18001-	9	7.250000	0	8.96825-10	10	7.300000	0	6.49335-10	10	9126080801	290
7.350000	0	4.39890-10	10	7.400000	0	2.70464-10	10	7.450000	0	1.43886-10	10	9126080801	291
7.500000	0	0.00000	0	0.000000	0	0.00000	0	0.000000	0	0.00000	0	9126080801	292
0.	151	1.0000E+01	1	0	0	0	0	1	151	126080801	293		
				0	0	0	0	0		9126080801	294		
0.000000	0	1.14445-	9	5.000000	2	1.05053-	8	1.000000	1	4.11339-	8	8126080801	295
1.500000	1	2.94744-	8	2.000000	1	4.71157-	8	2.500000	1	9.21971-	8	8126080801	296
3.000000	1	3.24239-	8	3.500000	1	9.39347-	8	4.000000	1	4.98916-	8	8126080801	297
4.500000	1	1.03015-	7	5.000000	1	2.69000-	7	5.500000	1	1.30296-	7	8126080801	298
6.000000	1	1.87260-	7	6.500000	1	6.59477-	8	7.000000	1	1.00073-	7	8126080801	299
7.500000	1	7.67201-	8	8.000000	1	1.38208-	7	8.500000	1	7.25144-	8	8126080801	300
9.000000	1	9.93545-	8	9.500000	1	1.27497-	7	1.000000	0	7.97401-	8	8126080801	301
1.050000	0	1.01220-	7	1.100000	0	2.29078-	7	1.150000	0	7.54811-	8	8126080801	302
1.200000	0	1.17802-	7	1.250000	0	3.39025-	7	1.300000	0	2.29780-	7	8126080801	303
1.350000	0	4.97138-	8	1.400000	0	1.20173-	7	1.450000	0	1.34108-	7	8126080801	304
1.500000	0	1.49754-	7	1.550000	0	1.26587-	7	1.600000	0	1.10525-	7	8126080801	305
1.650000	0	1.05426-	7	1.700000	0	1.03849-	7	1.750000	0	1.29433-	7	8126080801	306
1.800000	0	9.74555-	8	1.850000	0	1.09462-	7	1.900000	0	9.87136-	8	8126080801	307
1.950000	0	1.30557-	7	2.000000	0	1.06931-	7	2.050000	0	9.17704-	8	8126080801	308
2.100000	0	1.10025-	7	2.150000	0	9.23031-	8	2.200000	0	1.00972-	7	8126080801	309
2.250000	0	1.08342-	7	2.300000	0	1.13304-	7	2.350000	0	8.98342-	8	8126080801	310
2.400000	0	1.03194-	7	2.450000	0	1.12744-	7	2.500000	0	1.08291-	7	8126080801	311
2.550000	0	1.08792-	7	2.600000	0	7.02232-	7	2.650000	0	8.04228-	8	8126080801	312
2.700000	0	1.13510-	7	2.750000	0	1.08241-	7	2.800000	0	8.28013-	8	8126080801	313
2.850000	0	1.03230-	7	2.900000	0	8.93452-	8	2.950000	0	6.77710-	8	8126080801	314
3.000000	0	6.86730-	8	3.050000	0	6.71329-	8	3.100000	0	6.93428-	8	8126080801	315
3.150000	0	3.93547-	8	3.200000	0	5.83092-	8	3.250000	0	5.50230-	8	8126080801	316
3.300000	0	5.97440-	8	3.350000	0	6.88826-	8	3.400000	0	6.28805-	8	8126080801	317
3.450000	0	4.94767-	8	3.500000	0	5.69214-	8	3.550000	0	1.21471-	7	8126080801	318
3.600000	0	6.17054-	8	3.650000	0	4.06751-	8	3.700000	0	4.61195-	8	8126080801	319
3.750000	0	4.36021-	8	3.800000	0	4.87002-	8	3.850000	0	3.31685-	8	8126080801	320
3.900000	0	3.46087-	8	3.950000	0	3.13000-	8	4.000000	0	2.90421-	8	8126080801	321
4.050000	0	6.44595-	8	4.100000	0	6.29013-	8	4.150000	0	2.56813-	8	8126080801	322
4.200000	0	2.00451-	8	4.250000	0	4.36883-	8	4.300000	0	2.37226-	8	8126080801	323
4.350000	0	3.86109-	8	4.400000	0	2.43057-	8	4.450000	0	2.55133-	8	8126080801	324
4.500000	0	2.20005-	8	4.550000	0	2.00201-	8	4.600000	0	2.81309-	8	8126080801	325
4.650000	0	1.88086-	8	4.700000	0	1.82284-	8	4.750000	0	1.78325-	8	8126080801	326
4.800000	0	2.11490-	8	4.850000	0	1.65099-	8	4.900000	0	1.80999-	8	8126080801	327
4.950000	0	1.62305-	8	5.000000	0	1.49756-	8	5.050000	0	1.64887-	8	8126080801	328
5.100000	0	1.39294-	8	5.150000	0	2.00925-	8	5.200000	0	1.72939-	8	8126080801	329
5.250000	0	1.30304-	8	5.300000	0	1.46737-	8	5.350000	0	1.26846-	8	8126080801	330
5.400000	0	1.06838-	8	5.450000	0	1.22898-	8	5.500000	0	1.42300-	8	8126080801	331
5.550000	0	1.30060-	8	5.600000	0	7.35753-	8	5.650000	0	8.90035-	9	9126080801	332
5.700000	0	1.00547-	8	5.750000	0	8.15814-	9	5.800000	0	7.80399-	9	9126080801	333
5.850000	0	9.02742-	9	5.900000	0	8.22291-	9	5.950000	0	6.80883-	9	9126080801	334
6.000000	0	9.71302-	9	6.050000	0	6.20027-	9	6.100000	0	7.85541-	9	9126080801	335
6.150000	0	3.62463-	9	6.200000	0	6.81018-	9	6.250000	0	5.04784-	9	9126080801	336
6.300000	0	4.76393-	9	6.350000	0	4.48120-	9	6.400000	0	4.19471-	9	9126080801	337
6.450000	0	3.92037-	9	6.500000	0	3.64221-	9	6.550000	0	3.36998-	9	9126080801	338
6.600000	0	3.10352-	9	6.650000	0	2.87058-	9	6.700000	0	2.58348-	9	9126080801	339

5.750000	0	2.33363-	9	6.800000	0	2.09209-	9	6.850000	0	1.85803-	9	126080801	340
5.900000	0	1.63438-	9	6.950000	0	1.42023-	9	7.000000	0	1.21743-	9	126080801	341
7.050000	0	1.02678-	9	7.100000	0	8.49295-	10	7.150000	0	6.86502-	10	126080801	342
7.200000	0	5.39062-	10	7.250000	0	4.07319-	10	7.300000	0	2.92402-	10	126080801	343
7.350000	0	1.75298-	10	7.400000	0	1.16893-	10	7.450000	0	5.85000-	11	126080801	344
7.500000	0	0.00000+	0	0.000000	0	0.00000+	0	0.000000	0	0.00000+	0	126080801	345
0.	151	5.0000E+01	0	0	0	0	0	1	151	126080801	346		
0.000000	0	5.42088-	10	5.000000	2	4.10100-	9	1.000000	0	6.92609-	9	126080801	347
1.500000	1	9.95872-	9	2.000000	1	1.47726-	8	2.500000	1	1.63049-	8	126080801	348
3.000000	1	1.28174-	8	3.500000	1	1.93069-	8	4.000000	1	1.55290-	8	126080801	349
4.500000	1	2.00740-	8	5.000000	1	2.87334-	8	5.500000	1	2.44852-	8	126080801	350
6.000000	1	4.67742-	8	6.500000	1	2.20933-	8	7.000000	1	3.10538-	8	126080801	351
7.500000	1	2.15074-	8	8.000000	1	3.67353-	8	8.500000	1	2.60645-	8	126080801	352
9.000000	1	3.42889-	8	9.500000	1	3.38241-	8	1.000000	0	2.84571-	8	126080801	353
1.050000	0	2.71914-	8	1.100000	0	4.37803-	8	1.150000	0	2.31293-	8	126080801	354
1.200000	0	3.34742-	8	1.250000	0	2.84013-	8	1.300000	0	7.51518-	8	126080801	355
1.350000	0	3.21817-	8	1.400000	0	1.12723-	7	1.450000	0	3.99422-	8	126080801	356
1.500000	0	4.24262-	8	1.550000	0	3.75732-	8	1.600000	0	3.33129-	8	126080801	357
1.650000	0	3.04665-	8	1.700000	0	2.65011-	8	1.750000	0	3.51183-	8	126080801	358
1.800000	0	2.05144-	8	1.850000	0	5.85520-	8	1.900000	0	2.62874-	8	126080801	359
1.950000	0	3.02181-	8	2.000000	0	2.84860-	8	2.050000	0	2.24246-	8	126080801	360
2.100000	0	2.89580-	8	2.150000	0	2.33209-	8	2.200000	0	2.53393-	8	126080801	361
2.250000	0	2.84692-	8	2.300000	0	3.08240-	8	2.350000	0	2.09547-	8	126080801	362
2.400000	0	2.55255-	8	2.450000	0	2.08579-	8	2.500000	0	2.81455-	8	126080801	363
2.550000	0	5.32835-	8	2.600000	0	2.34591-	8	2.650000	0	1.70035-	8	126080801	364
2.700000	0	2.28837-	8	2.750000	0	2.99565-	8	2.800000	0	1.67025-	8	126080801	365
2.850000	0	2.37528-	8	2.900000	0	2.14820-	8	2.950000	0	1.41573-	8	126080801	366
3.000000	0	1.49884-	8	3.050000	0	1.45254-	8	3.100000	0	1.55951-	8	126080801	367
3.150000	0	1.21023-	8	3.200000	0	1.21483-	8	3.250000	0	1.14026-	8	126080801	368
3.300000	0	1.48078-	8	3.350000	0	2.01080-	8	3.400000	0	1.52885-	8	126080801	369
3.450000	0	1.02132-	8	3.500000	0	1.50737-	8	3.550000	0	4.03640-	8	126080801	370
3.600000	0	1.59637-	8	3.650000	0	1.41062-	9	3.700000	0	1.02544-	8	126080801	371
3.750000	0	9.33700-	9	3.800000	0	1.17134-	8	3.850000	0	5.66208-	9	126080801	372
3.900000	0	6.42909-	9	3.950000	0	5.35782-	9	4.000000	0	4.46403-	9	126080801	373
4.050000	0	1.92192-	8	4.100000	0	2.06811-	8	4.150000	0	3.57600-	9	126080801	374
4.200000	0	3.75049-	9	4.250000	0	1.12509-	9	4.300000	0	3.27207-	9	126080801	375
4.350000	0	1.25472-	8	4.400000	0	2.79429-	9	4.450000	0	4.39400-	9	126080801	376
4.500000	0	2.73669-	9	4.550000	0	2.23805-	9	4.600000	0	5.07156-	9	126080801	377
4.650000	0	1.98336-	9	4.700000	0	1.86448-	9	4.750000	0	1.81811-	9	126080801	378
4.800000	0	1.70998-	9	4.850000	0	1.54498-	9	4.900000	0	1.47871-	9	126080801	379
4.950000	0	1.75718-	9	5.000000	0	1.26855-	9	5.050000	0	1.42208-	9	126080801	380
5.100000	0	1.09477-	9	5.150000	0	2.64685-	9	5.200000	0	9.91870-	10	126080801	381
5.250000	0	1.22402-	9	5.300000	0	1.44933-	9	5.350000	0	7.29095-	10	126080801	382
5.400000	0	3.45429-	9	5.450000	0	6.10373-	10	5.500000	0	2.56356-	9	126080801	383
5.550000	0	5.52564-	10	5.600000	0	4.91742-	10	5.650000	0	3.90697-	10	126080801	384
5.700000	0	3.73580-	10	5.750000	0	3.17068-	10	5.800000	0	2.84193-	10	126080801	385
5.850000	0	2.75581-	10	5.900000	0	2.55093-	10	5.950000	0	2.03012-	10	126080801	386
6.000000	0	2.16877-	10	6.050000	0	1.65571-	10	6.100000	0	1.78138-	10	126080801	387
6.150000	0	1.38825-	10	6.200000	0	8.55565-	10	6.250000	0	1.17591-	10	126080801	388
6.300000	0	1.09014-	10	6.350000	0	1.00742-	10	6.400000	0	9.30038-	11	126080801	389
6.450000	0	8.52567-	11	6.500000	0	7.70853-	11	6.550000	0	7.03836-	11	126080801	390
6.600000	0	6.33432-	11	6.650000	0	5.65500-	11	6.700000	0	5.00557-	11	126080801	391
6.750000	0	4.38613-	11	6.800000	0	3.80184-	11	6.850000	0	3.25259-	11	126080801	392
6.900000	0	2.74132-	11	6.950000	0	2.27114-	11	7.000000	0	1.84509-	11	126080801	393
7.050000	0	1.46902-	11	7.100000	0	1.14390-	11	7.150000	0	8.74676-	12	126080801	394
7.200000	0	6.00483-	12	7.250000	0	4.87760-	12	7.300000	0	3.50653-	12	126080801	395
7.350000	0	2.37780-	12	7.400000	0	1.46427-	12	7.450000	0	7.81888-	13	126080801	396
7.500000	0	0.00000+	0	0.000000	0	0.00000+	0	0.000000	0	0.00000+	0	126080801	397
0.	151	1.0000E+02	0	0	0	0	0	1	151	126080801	398		
0.000000	0	3.00060-	10	5.000000	2	2.24882-	9	1.000000	0	2.75756-	9	126080801	399
1.500000	1	5.38716-	9	2.000000	1	6.71057-	9	2.500000	1	8.69451-	9	126080801	400
3.000000	1	7.55570-	9	3.500000	1	9.05048-	9	4.000000	1	9.37811-	9	126080801	401
4.500000	1	1.23463-	8	5.000000	1	1.09917-	8	5.500000	1	1.41351-	8	126080801	402
6.000000	1	2.26078-	8	6.500000	1	1.18543-	8	7.000000	1	1.78782-	8	126080801	403
7.500000	1	1.11777-	8	8.000000	1	2.34913-	8	8.500000	1	1.54903-	8	126080801	404
9.000000	1	1.99899-	9	9.500000	1	1.80565-	8	1.000000	0	1.63978-	8	126080801	405
1.050000	0	1.47357-	8	1.100000	0	2.73422-	8	1.150000	0	1.18610-	8	126080801	406

1.200000	0	1.815000	8	1.250000	0	1.430720	8	1.300000	0	3.610015	-	81260000001	409
1.350000	0	1.740170	8	1.400000	0	5.680669	8	1.450000	0	1.959010	-	81260000001	410
1.500000	0	1.973490	8	1.550000	0	1.814770	8	1.600000	0	1.616170	-	81260000001	411
1.650000	0	1.583661	8	1.700000	0	1.201668	8	1.750000	0	1.603007	-	81260000001	412
1.800000	0	1.291900	8	1.850000	0	1.350059	8	1.900000	0	1.271006	-	81260000001	413
1.950000	0	1.784520	8	2.000000	0	1.474990	8	2.050000	0	1.054408	-	81260000001	414
2.100000	0	1.384190	8	2.150000	0	1.190270	8	2.200000	0	1.221490	-	81260000001	415
2.250000	0	1.379520	8	2.300000	0	1.436180	8	2.350000	0	1.005000	-	81260000001	416
2.400000	0	1.402500	8	2.450000	0	9.350740	9	2.500000	0	1.337040	-	81260000001	417
2.550000	0	2.511120	8	2.600000	0	1.103510	8	2.650000	0	7.882005	-	91260000001	418
2.700000	0	9.904500	9	2.750000	0	1.510870	8	2.800000	0	7.856003	-	91260000001	419
2.850000	0	1.086540	8	2.900000	0	9.820038	9	2.950000	0	6.535003	-	91260000001	420
3.000000	0	7.396810	9	3.050000	0	6.731560	9	3.100000	0	7.834180	-	91260000001	421
3.150000	0	5.021100	9	3.200000	0	5.730920	9	3.250000	0	5.574190	-	91260000001	422
3.300000	0	8.347000	9	3.350000	0	1.224420	8	3.400000	0	7.117470	-	91260000001	423
3.450000	0	4.829660	9	3.500000	0	8.992550	9	3.550000	0	1.908000	-	81260000001	424
3.600000	0	7.439720	9	3.650000	0	3.510200	9	3.700000	0	4.962780	-	91260000001	425
3.750000	0	4.356330	9	3.800000	0	5.690063	9	3.850000	0	2.732007	-	91260000001	426
3.900000	0	3.139520	9	3.950000	0	2.713920	9	4.000000	0	2.074040	-	91260000001	427
4.050000	0	9.075000	9	4.100000	0	1.220000	8	4.150000	0	1.637000	-	91260000001	428
4.200000	0	1.808560	9	4.250000	0	5.250700	9	4.300000	0	1.588000	-	91260000001	429
4.350000	0	9.010140	9	4.400000	0	1.233860	9	4.450000	0	2.141000	-	91260000001	430
4.500000	0	1.209190	9	4.550000	0	9.775005	10	4.600000	0	3.248740	-	91260000001	431
4.650000	0	8.028760	10	4.700000	0	8.050140	10	4.750000	0	7.821710	-	101260000001	432
4.800000	0	7.411440	10	4.850000	0	6.548600	10	4.900000	0	6.145010	-	101260000001	433
4.950000	0	8.028200	10	5.000000	0	5.288280	10	5.050000	0	6.657490	-	101260000001	434
5.100000	0	4.498500	10	5.150000	0	1.660180	9	5.200000	0	3.828280	-	101260000001	435
5.250000	0	6.401190	10	5.300000	0	8.255110	10	5.350000	0	2.801730	-	101260000001	436
5.400000	0	1.073780	9	5.450000	0	2.250010	10	5.500000	0	1.230000	-	91260000001	437
5.550000	0	1.853440	10	5.600000	0	1.630230	10	5.650000	0	1.394800	-	101260000001	438
5.700000	0	1.256470	10	5.750000	0	7.080000	10	5.800000	0	9.448000	-	111260000001	439
5.850000	0	0.414800	11	5.900000	0	7.352890	11	5.950000	0	6.038000	-	111260000001	440
6.000000	0	5.675100	11	6.050000	0	4.490000	11	6.100000	0	4.245700	-	111260000001	441
6.150000	0	3.474600	11	6.200000	0	4.004330	10	6.250000	0	2.802000	-	111260000001	442
6.300000	0	2.572520	11	6.350000	0	2.370710	11	6.400000	0	2.172000	-	111260000001	443
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6.750000	0	9.536000	12	6.800000	0	8.100160	12	6.850000	0	6.778350	-	121260000001	446
6.900000	0	5.551180	12	6.950000	0	4.437340	12	7.000000	0	3.440130	-	121260000001	447
7.050000	0	2.585970	12	7.100000	0	7.100000	12	7.150000	0	1.300000	-	121260000001	448
7.200000	0	8.852000	13	7.250000	0	5.980000	13	7.300000	0	4.230720	-	131260000001	449
7.350000	0	2.890000	13	7.400000	0	1.800000	13	7.450000	0	9.918000	-	141260000001	450
7.500000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	0	0.000000	-	01260000001	451
0.		5.000000E+02		0		0		0		1511260000001		452	

0.000000	0	1.217460	10	5.000000	2	7.839810	10	1.000000	1	4.786170	-	101260000001	453
1.500000	1	1.433000	9	2.000000	1	1.120320	9	2.500000	1	2.138000	-	91260000001	454
3.000000	1	2.033270	9	3.000000	1	7.000000	9	4.000000	1	2.634000	-	91260000001	455
4.500000	1	3.696340	9	5.000000	1	7.850042	9	5.500000	1	4.164110	-	91260000001	456
6.000000	1	2.634750	9	6.500000	1	5.526930	9	7.000000	1	4.159000	-	91260000001	457
7.500000	1	2.400000	9	8.000000	1	6.102570	9	8.500000	1	5.022000	-	91260000001	458
9.000000	1	6.042420	9	9.500000	1	3.231960	9	1.000000	0	5.662290	-	91260000001	459
1.050000	0	3.150000	9	1.100000	0	3.680260	9	1.150000	0	2.411340	-	91260000001	460
1.200000	0	5.233650	9	1.250000	0	3.183300	9	1.300000	0	3.185270	-	91260000001	461
1.350000	0	3.773430	9	1.400000	0	4.421930	9	1.450000	0	2.527000	-	91260000001	462
1.500000	0	3.102770	9	1.550000	0	2.030190	9	1.600000	0	2.219550	-	91260000001	463
1.650000	0	3.427220	9	1.700000	0	2.133970	9	1.750000	0	2.853000	-	91260000001	464
1.800000	0	2.119730	9	1.850000	0	2.187950	9	1.900000	0	2.040000	-	91260000001	465
1.950000	0	1.551410	9	2.000000	0	3.511620	9	2.050000	0	1.631000	-	91260000001	466
2.100000	0	2.048690	9	2.150000	0	3.150000	9	2.200000	0	1.942000	-	91260000001	467
2.250000	0	1.791070	9	2.300000	0	1.402680	9	2.350000	0	2.026000	-	91260000001	468
2.400000	0	1.372660	9	2.450000	0	1.411150	9	2.500000	0	1.739370	-	91260000001	469
2.550000	0	2.450330	9	2.600000	0	1.661510	9	2.650000	0	1.295000	-	91260000001	470
2.700000	0	1.219970	9	2.750000	0	1.977840	9	2.800000	0	1.206270	-	91260000001	471
2.850000	0	1.255710	9	2.900000	0	8.875930	10	2.950000	0	8.916000	-	101260000001	472
3.000000	0	1.119720	9	3.050000	0	7.707560	10	3.100000	0	1.297000	-	91260000001	473
3.150000	0	7.195000	10	3.200000	0	7.652330	10	3.250000	0	7.987470	-	101260000001	474
3.300000	0	1.517260	9	3.350000	0	2.017000	9	3.400000	0	5.684680	-	101260000001	475

3.45000+	0	5.61457-10	3.50000+	0	1.61196-9	3.55000+	0	1.03134-9126080801	477
3.60000+	0	4.74594-10	3.65000+	0	4.29513-10	3.70000+	0	4.85919-10126080801	478
3.75000+	0	3.33751-10	3.80000+	0	4.34571-10	3.85000+	0	3.00847-10126080801	479
3.90000+	0	4.22810-10	3.95000+	0	2.90570-10	4.00000+	0	1.87072-10126080801	480
4.05000+	0	3.16640-10	4.10000+	0	1.38863-9	4.15000+	0	1.20916-10126080801	481
4.20000+	0	1.80428-10	4.25000+	0	1.61857-10	4.30000+	0	1.34832-10126080801	482
4.35000+	0	1.52767-9	4.40000+	0	6.37788-11	4.45000+	0	1.43140-10126080801	483
4.50000+	0	5.31321-11	4.55000+	0	4.71506-11	4.60000+	0	4.84023-10126080801	484
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4.80000+	0	3.10737-11	4.85000+	0	5.82755-11	4.90000+	0	2.59748-11126080801	486
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6.30000+	0	1.21889-13	6.35000+	0	1.11720-13	6.40000+	0	1.02425-13126080801	496
6.45000+	0	9.33180-14	6.50000+	0	8.44295-14	6.55000+	0	7.58225-14126080801	497
6.60000+	0	6.74719-14	6.65000+	0	5.94868-14	6.70000+	0	5.18308-14126080801	498
6.75000+	0	4.45669-14	6.80000+	0	3.77331-14	6.85000+	0	3.13508-14126080801	499
6.90000+	0	2.34744-14	6.95000+	0	2.01351-14	7.00000+	0	1.53758-14126080801	500
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7.20000+	0	3.00369-15	7.25000+	0	1.79558-15	7.30000+	0	1.22000-15126080801	502
7.35000+	0	8.34900-16	7.40000+	0	5.22205-15	7.45000+	0	2.88159-16126080801	503
7.50000+	0	0.00000+0	0.00000+	0	0.00000+0	0.00000+	0	0.00000+0126080801	504
0.	151	1.00000E+03	0	0	0	1	151	126080801	505
0.00000+	0	8.24016-11	5.00000-	2	1.91780-10	1.00000-	1	2.96927-10126080801	506
1.50000-	1	8.00975-10	2.00000-	1	6.09279-10	2.50000-	1	1.09402-9126080801	507
3.00000-	1	1.77234-9	3.50000-	1	8.92456-10	4.00000-	1	1.35253-9126080801	508
4.50000-	1	1.93001-9	5.00000-	1	1.15471-9	5.50000-	1	2.05737-9126080801	509
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9.00000-	1	4.29907-9	9.50000-	1	1.38806-9	1.00000+	0	3.79278-9126080801	512
1.05000+	0	1.47453-9	1.10000+	0	1.82354-9	1.15000+	0	1.27403-9126080801	513
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1.35000+	0	2.07627-9	1.40000+	0	2.19865-9	1.45000+	0	1.14120-9126080801	515
1.50000+	0	1.03987-9	1.55000+	0	9.98136-10	1.60000+	0	1.08078-9126080801	516
1.65000+	0	1.91275-9	1.70000+	0	1.05811-9	1.75000+	0	1.51855-9126080801	517
1.80000+	0	1.07490-9	1.85000+	0	1.13106-9	1.90000+	0	1.00037-9126080801	518
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2.25000+	0	8.19399-10	2.30000+	0	6.57488-10	2.35000+	0	1.21703-9126080801	521
2.40000+	0	5.51674-10	2.45000+	0	6.79410-10	2.50000+	0	8.44403-10126080801	522
2.55000+	0	1.43749-9	2.60000+	0	8.38285-10	2.65000+	0	6.05086-10126080801	523
2.70000+	0	5.90311-10	2.75000+	0	6.46055-10	2.80000+	0	5.38720-10126080801	524
2.85000+	0	4.30895-10	2.90000+	0	3.64044-10	2.95000+	0	4.25530-10126080801	525
3.00000+	0	4.45009-10	3.05000+	0	3.21860-10	3.10000+	0	4.63760-10126080801	526
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3.30000+	0	5.21089-10	3.35000+	0	2.90715-10	3.40000+	0	2.29438-10126080801	528
3.45000+	0	2.37455-10	3.50000+	0	4.65951-10	3.55000+	0	4.29807-10126080801	529
3.60000+	0	1.58386-10	3.65000+	0	1.60525-10	3.70000+	0	1.58575-10126080801	530
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3.90000+	0	2.12539-10	3.95000+	0	8.51134-11	4.00000+	0	6.07122-11126080801	532
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4.50000+	0	1.04651-11	4.55000+	0	9.14324-12	4.60000+	0	6.62834-11126080801	536
4.65000+	0	7.45355-12	4.70000+	0	7.57035-12	4.75000+	0	5.22392-12126080801	537
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4.95000+	0	9.57987-12	5.00000+	0	2.83225-12	5.05000+	0	6.80381-12126080801	539
5.10000+	0	2.16099-12	5.15000+	0	3.28434-11	5.20000+	0	1.63303-12126080801	540
5.25000+	0	8.82679-12	5.30000+	0	1.40415-11	5.35000+	0	1.13997-12126080801	541
5.40000+	0	1.09475-12	5.45000+	0	9.19491-13	5.50000+	0	8.86720-13126080801	542
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6.000000	0	1.47550-13	6.050000	0	1.04849-13	6.100000	0	6.90212-14	126080801	547
6.150000	0	4.02428-14	6.200000	0	2.85225-14	6.250000	0	6.52715-15	126080801	548
6.300000	0	2.39501-15	6.350000	0	2.14337-15	6.400000	0	1.94036-15	126080801	549
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6.750000	0	1.00744-15	6.800000	0	8.85417-16	6.850000	0	7.69074-16	126080801	552
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7.050000	0	3.76549-16	7.100000	0	2.99537-16	7.150000	0	2.32377-16	126080801	554
7.200000	0	1.72614-16	7.250000	0	1.27005-16	7.300000	0	9.39006-17	126080801	555
7.350000	0	6.45959-17	7.400000	0	4.08066-17	7.450000	0	2.29780-17	126080801	556
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1.500000	1	1.56076-10	2.000000	1	1.12792-10	2.500000	1	1.38837-10	126080801	560
3.000000	1	2.54682-10	3.500000	1	1.26397-10	4.000000	1	2.44325-10	126080801	561
4.500000	1	3.46589-10	5.000000	1	2.35362-10	5.500000	1	2.42512-10	126080801	562
6.000000	1	4.09094-10	6.500000	1	2.41490-10	7.000000	1	3.48559-10	126080801	563
7.500000	1	3.77299-10	8.000000	1	7.30513-10	8.500000	1	6.70297-10	126080801	564
9.000000	1	6.37175-10	9.500000	1	2.38492-10	1.000000	0	5.16133-10	126080801	565
1.050000	0	2.46380-10	1.100000	0	3.19525-10	1.150000	0	1.95710-10	126080801	566
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1.650000	0	1.95917-10	1.700000	0	1.83683-10	1.750000	0	1.86608-10	126080801	570
1.800000	0	2.76583-10	1.850000	0	1.50677-10	1.900000	0	1.83597-10	126080801	571
1.950000	0	4.35708-11	2.000000	0	2.57657-10	2.050000	0	1.28149-10	126080801	572
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2.250000	0	5.02747-11	2.300000	0	6.70731-11	2.350000	0	4.97033-10	126080801	574
2.400000	0	5.47168-11	2.450000	0	9.33109-11	2.500000	0	1.92478-10	126080801	575
2.550000	0	1.49017-10	2.600000	0	1.43279-10	2.650000	0	9.77349-11	126080801	576
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3.000000	0	6.74741-11	3.050000	0	3.11695-11	3.100000	0	2.92051-11	126080801	579
3.150000	0	3.32067-11	3.200000	0	4.32292-11	3.250000	0	2.58874-11	126080801	580
3.300000	0	4.96531-11	3.350000	0	2.67362-11	3.400000	0	2.55715-11	126080801	581
3.450000	0	2.04067-11	3.500000	0	2.32631-11	3.550000	0	1.93550-11	126080801	582
3.600000	0	4.78038-11	3.650000	0	1.44163-11	3.700000	0	1.92814-11	126080801	583
3.750000	0	1.23926-11	3.800000	0	1.17425-11	3.850000	0	1.52143-11	126080801	584
3.900000	0	3.75357-11	3.950000	0	1.06331-11	4.000000	0	5.95263-11	126080801	585
4.050000	0	1.04125-11	4.100000	0	7.98489-12	4.150000	0	7.07463-11	126080801	586
4.200000	0	6.25000-12	4.250000	0	5.93905-12	4.300000	0	5.40719-11	126080801	587
4.350000	0	3.23390-12	4.400000	0	4.40086-12	4.450000	0	3.97342-11	126080801	588
4.500000	0	3.33612-12	4.550000	0	3.14150-12	4.600000	0	2.90777-11	126080801	589
4.650000	0	2.41348-12	4.700000	0	2.57144-12	4.750000	0	1.76921-11	126080801	590
4.800000	0	1.48082-12	4.850000	0	1.32765-12	4.900000	0	9.75577-12	126080801	591
4.950000	0	7.65663-13	5.000000	0	5.55053-13	5.050000	0	3.91704-12	126080801	592
5.100000	0	2.39976-13	5.150000	0	1.84427-13	5.200000	0	4.95284-12	126080801	593
5.250000	0	2.24686-14	5.300000	0	2.52669-14	5.350000	0	1.68887-12	126080801	594
5.400000	0	1.59448-15	5.450000	0	1.36779-15	5.500000	0	1.29257-12	126080801	595
5.550000	0	1.14871-15	5.600000	0	7.02037-15	5.650000	0	8.67524-12	126080801	596
5.700000	0	7.69789-16	5.750000	0	6.50113-16	5.800000	0	5.49329-12	126080801	597
5.850000	0	4.68171-16	5.900000	0	2.34925-16	5.950000	0	2.86603-12	126080801	598
6.000000	0	2.42335-16	6.050000	0	1.51724-16	6.100000	0	1.15545-12	126080801	599
6.150000	0	5.05307-17	6.200000	0	4.96788-17	6.250000	0	6.92904-13	126080801	600
6.300000	0	9.69839-17	6.350000	0	7.57490-17	6.400000	0	6.94595-13	126080801	601
6.450000	0	6.30928-19	6.500000	0	5.68363-19	6.550000	0	5.08665-13	126080801	602
6.600000	0	4.50072-19	6.650000	0	3.94290-19	6.700000	0	3.40775-13	126080801	603
6.750000	0	2.90078-19	6.800000	0	2.42404-19	6.850000	0	1.98132-13	126080801	604
6.900000	0	1.57415-19	6.950000	0	1.20723-19	7.000000	0	8.82537-14	126080801	605
7.050000	0	6.03046-20	7.100000	0	3.70845-20	7.150000	0	1.95212-14	126080801	606
7.200000	0	7.31970-21	7.250000	0	1.04958-21	7.300000	0	0.00000+03	126080801	607
0.	147	1.00000+04	0.	0	0.	0.	1	147126080801	126080801	608
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1.500000	1	6.70472-11	2.000000	1	5.80236-11	2.500000	1	5.75879-11	126080801	610
3.000000	1	7.17152-11	3.500000	1	5.32883-11	4.000000	1	1.95617-11	126080801	611
4.500000	1	9.33607-11	5.000000	1	1.11459-10	5.500000	1	1.15957-11	126080801	612

3.900000	0	6.46398-23	3.950000	0	6.03271-23	4.000000	0	5.61159-23	126080802	2419
4.050000	0	5.19045-23	4.100000	0	4.78405-23	4.150000	0	4.38881-23	126080802	2420
4.200000	0	4.00574-23	4.250000	0	3.63891-23	4.300000	0	3.29287-23	126080802	2421
4.350000	0	2.76460-23	4.400000	0	2.66018-23	4.450000	0	2.37909-23	126080802	2422
4.500000	0	2.12134-23	4.550000	0	1.87180-23	4.600000	0	1.64694-23	126080802	2423
4.650000	0	1.43080-23	4.700000	0	1.22887-23	4.750000	0	1.04053-23	126080802	2424
4.800000	0	8.68122-24	4.850000	0	7.12864-24	4.900000	0	5.70799-24	126080802	2425
4.950000	0	4.41113-24	5.000000	0	3.24721-24	5.050000	0	2.23052-24	126080802	2426
5.100000	0	1.39326-24	5.150000	0	7.34174-25	5.200000	0	2.77078-25	126080802	2427
5.250000	0	3.92661-26	5.300000	0	1.72721-29	5.350000	0	1.54251-29	126080802	2428
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5.550000	0	1.01582-29	5.600000	0	9.05223-30	5.650000	0	7.94608-30	126080802	2430
5.700000	0	6.97680-30	5.750000	0	5.94244-30	5.800000	0	5.06541-30	126080802	2431
5.850000	0	4.19268-30	5.900000	0	3.38286-30	5.950000	0	2.64256-30	126080802	2432
6.000000	0	1.47785-30	6.050000	0	1.37739-30	6.100000	0	9.06734-31	126080802	2433
6.150000	0	5.15019-31	6.200000	0	2.28042-31	6.250000	0	5.62250-31	126080802	2434
6.300000	0	1.35725-33	6.350000	0	0.000000	0.000000	0	0.000000	0126080802	2435
									126080803	2436
9.22335E+04	2.3104E+02								0126080803	2437
0.	0.								24126080803	2438
	24	0							0126080803	2439
0.	0.								126126080803	2440
	126	1							0126080803	2441
0.000000	0	1.00278-9	5.000000	2	2.39510-9	1.000000	1	1.58209-6	126080803	2442
1.500000	1	1.05556-7	2.000000	1	1.67180-7	2.500000	1	4.81025-7	126080803	2443
3.000000	1	9.04915-8	3.500000	1	4.47521-7	4.000000	1	3.74279-7	126080803	2444
4.500000	1	1.64324-6	5.000000	1	3.02416-6	5.500000	1	2.11812-6	126080803	2445
6.000000	1	8.14489-7	6.500000	1	1.25381-7	7.000000	1	3.14333-7	126080803	2446
7.500000	1	1.94761-7	8.000000	1	8.61656-6	8.500000	1	1.33535-6	126080803	2447
9.000000	1	1.92402-7	9.500000	1	4.23937-7	1.000000	0	1.27350-7	126080803	2448
1.050000	0	2.47845-7	1.100000	0	8.09259-7	1.150000	0	4.74744-8	8126080803	2449
1.200000	0	1.06273-6	1.250000	0	5.54597-7	1.300000	0	5.98311-7	126080803	2450
1.350000	0	1.55368-7	1.400000	0	8.83268-7	1.450000	0	2.38739-7	126080803	2451
1.500000	0	3.10599-7	1.550000	0	2.07555-7	1.600000	0	9.34039-8	8126080803	2452
1.650000	0	9.01150-8	1.700000	0	1.08041-7	1.750000	0	1.95199-7	126080803	2453
1.800000	0	4.95068-8	1.850000	0	1.20048-7	1.900000	0	4.69738-8	8126080803	2454
1.950000	0	1.39992-7	2.000000	0	8.49840-8	2.050000	0	3.64497-8	8126080803	2455
2.100000	0	8.89522-8	2.150000	0	2.36484-8	2.200000	0	5.82171-8	8126080803	2456
2.250000	0	7.85127-8	2.300000	0	9.24277-8	2.350000	0	3.00445-8	8126080803	2457
2.400000	0	8.59120-8	2.450000	0	2.88929-8	2.500000	0	8.53716-8	8126080803	2458
2.550000	0	2.67171-7	2.600000	0	8.69149-8	2.650000	0	1.83152-8	8126080803	2459
2.700000	0	2.67302-7	2.750000	0	1.20867-7	2.800000	0	1.08158-8	126080803	2460
2.850000	0	1.18599-7	2.900000	0	1.04789-8	2.950000	0	9.35042-9	9126080803	2461
3.000000	0	1.67824-8	3.050000	0	2.54355-8	3.100000	0	4.73117-8	8126080803	2462
3.150000	0	2.53853-8	3.200000	0	1.033002-8	3.250000	0	8.00246-8	9126080803	2463
3.300000	0	2.40287-8	3.350000	0	4.04227-8	3.400000	0	4.42258-8	8126080803	2464
3.450000	0	1.18195-8	3.500000	0	3.01110-8	3.550000	0	2.14223-8	126080803	2465
3.600000	0	5.95414-8	3.650000	0	1.51213-8	3.700000	0	2.67114-8	8126080803	2466
3.750000	0	3.22404-8	3.800000	0	4.43083-8	3.850000	0	1.58340-8	9126080803	2467
3.900000	0	9.40291-9	3.950000	0	2.61386-9	4.000000	0	1.32350-8	9126080803	2468
4.050000	0	9.95371-8	4.100000	0	9.62082-8	4.150000	0	9.59353-10	10126080803	2469
4.200000	0	8.90530-9	4.250000	0	5.39055-8	4.300000	0	1.78956-9	9126080803	2470
4.350000	0	3.15658-8	4.400000	0	2.71796-8	4.450000	0	1.15920-9	8126080803	2471
4.500000	0	1.56279-8	4.550000	0	3.59493-10	4.600000	0	5.57777-9	8126080803	2472
4.650000	0	1.41135-10	4.700000	0	8.09831-11	4.750000	0	5.02057-10	10126080803	2473
4.800000	0	4.58343-8	4.850000	0	1.52613-13	4.900000	0	2.42415-9	8126080803	2474
4.950000	0	1.54002-9	5.000000	0	0.000000	5.050000	0	2.04205-9	8126080803	2475
5.100000	0	0.000000	5.150000	0	6.30125-9	5.200000	0	5.15273-9	8126080803	2476
5.250000	0	1.18240-9	5.300000	0	2.18161-9	5.350000	0	1.44444-9	8126080803	2477
5.400000	0	1.33185-8	5.450000	0	2.05113-9	5.500000	0	9.64535-9	126080803	2478
5.550000	0	6.24788-8	5.600000	0	5.04117-8	5.650000	0	0.000000	0126080803	2479
5.700000	0	1.79852-8	5.750000	0	0.000000	5.800000	0	0.000000	0126080803	2480
5.850000	0	1.84244-8	5.900000	0	2.46557-8	5.950000	0	0.000000	0126080803	2481
6.000000	0	3.77199-8	6.050000	0	0.000000	6.100000	0	2.28129-8	8126080803	2482
6.150000	0	0.000000	6.200000	0	3.45399-9	6.250000	0	0.000000	0126080803	2483
0.	1.00000E-01								126126080803	2484
	126	1							0126080803	2485
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1.500000	1	9.63787-8	2.000000	1	1.53026-7	2.500000	1	4.40257-7	126080803	2487

3.00000-	1	8.11603-	8	3.50000-	1	4.08685-	7	4.00000-	1	3.28200-	7126080803	2488
4.50000-	1	1.47133-	6	5.00000-	1	2.67428-	6	5.50000-	1	1.84107-	6126080803	2489
6.00000-	1	7.97344-	7	6.50000-	1	1.16271-	7	7.00000-	1	2.87635-	7126080803	2490
7.50000-	1	1.78941-	7	8.00000-	1	7.23796-	6	8.50000-	1	1.19678-	7126080803	2491
9.00000-	1	1.75072-	7	9.50000-	1	3.87274-	7	1.00000+	0	1.13451-	7126080803	2492
1.05000+	0	2.25747-	7	1.10000+	0	7.37350-	7	1.15000+	0	4.40893-	8126080803	2493
1.20000+	0	9.04235-	7	1.25000+	0	5.01065-	7	1.30000+	0	5.50340-	7126080803	2494
1.35000+	0	1.38588-	7	1.40000+	0	8.17702-	7	1.45000+	0	2.20448-	7126080803	2495
1.50000+	0	2.85843-	7	1.55000+	0	1.90908-	7	1.60000+	0	8.74013-	8126080803	2496
1.65000+	0	8.34035-	8	1.70000+	0	9.88193-	8	1.75000+	0	1.79412-	7126080803	2497
1.80000+	0	4.52166-	8	1.85000+	0	1.09195-	7	1.90000+	0	4.38746-	8126080803	2498
1.95000+	0	1.39748-	7	2.00000+	0	7.80210-	8	2.05000+	0	3.30073-	8126080803	2499
2.10000+	0	8.24105-	8	2.15000+	0	2.22096-	8	2.20000+	0	5.42000-	8126080803	2500
2.25000+	0	7.30974-	8	2.30000+	0	8.33695-	8	2.35000+	0	2.78345-	8126080803	2501
2.40000+	0	7.75526-	8	2.45000+	0	2.57095-	7	2.50000+	0	8.01738-	8126080803	2502
2.55000+	0	2.49300-	7	2.60000+	0	8.12703-	8	2.65000+	0	1.78124-	8126080803	2503
2.70000+	0	2.39891-	7	2.75000+	0	1.11649-	7	2.80000+	0	9.63202-	8126080803	2504
2.85000+	0	1.10834-	7	2.90000+	0	6.55727-	8	2.95000+	0	8.74601-	9126080803	2505
3.00000+	0	1.57947-	8	3.05000+	0	2.30395-	8	3.10000+	0	4.29939-	8126080803	2506
3.15000+	0	2.20378-	8	3.20000+	0	9.64940-	9	3.25000+	0	7.30503-	9126080803	2507
3.30000+	0	2.23519-	8	3.35000+	0	4.39780-	8	3.40000+	0	4.15002-	8126080803	2508
3.45000+	0	1.11143-	8	3.50000+	0	3.38192-	8	3.55000+	0	2.01340-	7126080803	2509
3.60000+	0	5.49951-	8	3.65000+	0	1.34546-	8	3.70000+	0	2.49026-	8126080803	2510
3.75000+	0	2.10434-	8	3.80000+	0	4.13932-	8	3.85000+	0	1.50789-	9126080803	2511
3.90000+	0	8.83334-	9	3.95000+	0	4.32790-	9	4.00000+	0	1.24189-	9126080803	2512
4.05000+	0	9.35422-	8	4.10000+	0	9.03321-	8	4.15000+	0	9.06380-10	9126080803	2513
4.20000+	0	8.10373-	9	4.25000+	0	5.07110-	8	4.30000+	0	1.69697-	9126080803	2514
4.35000+	0	3.03350-	8	4.40000+	0	2.42044-	8	4.45000+	0	1.09112-	8126080803	2515
4.50000+	0	1.40228-	8	4.55000+	0	3.37754-10	10	4.60000+	0	5.01820-	8126080803	2516
4.65000+	0	1.32383-10	10	4.70000+	0	7.59924-11	11	4.75000+	0	4.71706-10	9126080803	2517
4.80000+	0	4.07213-	8	4.85000+	0	1.45534-13	13	4.90000+	0	2.15235-	8126080803	2518
4.95000+	0	1.58631-	9	5.00000+	0	5.00000+	0	5.05000+	0	1.81832-	8126080803	2519
5.10000+	0	0.00000+	0	5.15000+	0	5.62981-	8	5.20000+	0	4.57501-	8126080803	2520
5.25000+	0	1.13364-	9	5.30000+	0	1.95142-	8	5.35000+	0	1.28249-	8126080803	2521
5.40000+	0	1.23797-	8	5.45000+	0	1.82115-	8	5.50000+	0	9.11029-	9126080803	2522
5.55000+	0	5.54737-	8	5.60000+	0	4.47597-	8	5.65000+	0	0.00000+	9126080803	2523
5.70000+	0	1.35689-	8	5.75000+	0	0.00000+	0	5.80000+	0	0.00000+	9126080803	2524
5.85000+	0	1.03587-	8	5.90000+	0	2.18914-	8	5.95000+	0	0.00000+	9126080803	2525
6.00000+	0	3.34905-	8	6.05000+	0	0.00000+	0	6.10000+	0	2.02551-	8126080803	2526
6.15000+	0	0.00000+	0	6.20000+	0	3.26238-	9	6.25000+	0	0.00000+	9126080803	2527
0.	120	5.00000E-01	1	0	0	0	0	1	126126080803	8126080803	2528	
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1.50000-	1	7.44405-	8	2.00000-	1	1.19118-	7	2.50000-	1	3.40783-	7126080803	2531
3.00000-	1	5.95032-	8	3.50000-	1	3.14531-	7	4.00000-	1	2.21722-	7126080803	2532
4.50000-	1	9.80548-	7	5.00000-	1	1.85542-	6	5.50000-	1	1.20328-	6126080803	2533
6.00000-	1	6.11400-	7	6.50000-	1	9.20274-	8	7.00000-	1	2.23200-	7126080803	2534
7.50000-	1	1.40279-	7	8.00000-	1	4.03956-	6	8.50000-	1	8.74589-	8126080803	2535
9.00000-	1	1.43242-	7	9.50000-	1	2.98603-	7	1.00000+	0	8.14227-	8126080803	2536
1.05000+	0	1.75682-	7	1.10000+	0	5.65783-	7	1.15000+	0	3.58770-	8126080803	2537
1.20000+	0	5.44968-	7	1.25000+	0	3.74354-	7	1.30000+	0	4.35672-	7126080803	2538
1.35000+	0	9.97454-	8	1.40000+	0	6.59104-	7	1.45000+	0	1.76010-	7126080803	2539
1.50000+	0	2.26002-	7	1.55000+	0	1.50706-	7	1.60000+	0	7.27988-	8126080803	2540
1.65000+	0	6.72331-	8	1.70000+	0	7.67980-	8	1.75000+	0	1.41484-	7126080803	2541
1.80000+	0	3.72471-	8	1.85000+	0	8.35048-	8	1.90000+	0	3.63435-	8126080803	2542
1.95000+	0	1.13419-	7	2.00000+	0	6.14774-	8	2.05000+	0	2.49227-	8126080803	2543
2.10000+	0	6.66550-	8	2.15000+	0	1.87239-	8	2.20000+	0	4.44710-	8126080803	2544
2.25000+	0	5.98587-	8	2.30000+	0	7.16689-	8	2.35000+	0	2.25146-	8126080803	2545
2.40000+	0	5.21398-	8	2.45000+	0	1.82387-	7	2.50000+	0	6.74070-	8126080803	2546
2.55000+	0	2.05992-	7	2.60000+	0	6.73208-	8	2.65000+	0	1.52325-	8126080803	2547
2.70000+	0	1.75228-	7	2.75000+	0	8.96035-	8	2.80000+	0	6.86210-	8126080803	2548
2.85000+	0	7.16054-	8	2.90000+	0	5.36508-	8	2.95000+	0	7.27773-	9126080803	2549
3.00000+	0	1.33531-	8	3.05000+	0	1.75105-	8	3.10000+	0	3.27997-	8126080803	2550
3.15000+	0	1.45989-	8	3.20000+	0	8.06004-	9	3.25000+	0	5.67883-	9126080803	2551
3.30000+	0	1.83771-	8	3.35000+	0	3.79060-	8	3.40000+	0	3.48333-	8126080803	2552
3.45000+	0	9.39279-	9	3.50000+	0	2.82651-	8	3.55000+	0	1.69700-	7126080803	2553
3.60000+	0	4.03088-	8	3.65000+	0	9.57854-	9	3.70000+	0	2.05425-	8126080803	2554
3.75000+	0	1.77222-	8	3.80000+	0	3.41796-	8	3.85000+	0	1.32272-	9126080803	2555
3.90000+	0	7.44450-	9	3.95000+	0	3.63133-	9	4.00000+	0	1.04277-	9126080803	2556

4.050000	0	1.88514-	8	4.100000	0	7.50458-	8	4.150000	0	7.56004-	10	126080803	2557
4.200000	0	0.07230-	9	4.250000	0	4.27353-	8	4.300000	0	1.47011-	9	126080803	2558
4.350000	0	2.70584-	8	4.400000	0	1.72268-	8	4.450000	0	9.24326-	9	126080803	2559
4.500000	0	1.02458-	8	4.550000	0	2.84693-	10	4.600000	0	3.70302-	8	126080803	2560
4.650000	0	1.11065-	10	4.700000	0	6.38434-	11	4.750000	0	3.97601-	10	126080803	2561
4.800000	0	2.87408-	8	4.850000	0	1.28170-	13	4.900000	0	1.51506-	8	126080803	2562
4.950000	0	1.28539-	9	5.000000	0	0.000000	0	5.050000	0	1.29313-	8	126080803	2563
5.100000	0	0.000000	0	5.150000	0	4.05441-	8	5.200000	0	3.22108-	8	126080803	2564
5.250000	0	1.01298-	9	5.300000	0	1.41115-	8	5.350000	0	9.03131-	9	126080803	2565
5.400000	0	1.07773-	8	5.450000	0	1.28243-	8	5.500000	0	7.80478-	8	126080803	2566
5.550000	0	3.90640-	8	5.600000	0	3.15198-	8	5.650000	0	0.000000	0	126080803	2567
5.700000	0	1.12450-	8	5.750000	0	0.000000	0	5.800000	0	0.000000	0	126080803	2568
5.850000	0	1.15197-	8	5.900000	0	7.54163-	8	5.950000	0	0.000000	0	126080803	2569
6.000000	0	2.35831-	8	6.050000	0	2.000000	0	6.100000	0	1.42635-	8	126080803	2570
6.150000	0	0.000000	0	6.200000	0	5.79495-	9	6.250000	0	0.000000	0	126080803	2571
0.	1.00000E+00			0				0	1	126126080803		2572	
0.000000	0	1.33883-	10	5.000000	2	1.65434-	8	1.000000	0	4.75335-	7	126080803	2573
1.500000	1	6.17738-	8	2.000000	1	9.94398-	8	2.500000	1	2.80547-	7	126080803	2574
3.000000	1	4.78762-	8	3.500000	1	2.58384-	7	4.000000	1	1.65188-	7	126080803	2575
4.500000	1	6.72076-	7	5.000000	1	1.40030-	6	5.500000	1	8.67435-	7	126080803	2576
6.000000	1	5.01897-	7	6.500000	1	7.79116-	8	7.000000	1	1.85215-	7	126080803	2577
7.500000	1	1.16787-	7	8.000000	1	2.37689-	6	8.500000	1	7.01330-	8	126080803	2578
9.000000	1	1.22312-	7	9.500000	1	2.45959-	7	1.000000	0	6.45006-	8	126080803	2579
1.050000	0	1.45101-	7	1.100000	0	4.67193-	7	1.150000	0	3.09628-	8	126080803	2580
1.200000	0	3.65307-	7	1.250000	0	2.99822-	7	1.300000	0	3.69349-	7	126080803	2581
1.350000	0	7.91064-	8	1.400000	0	5.84842-	7	1.450000	0	1.49342-	7	126080803	2582
1.500000	0	1.90486-	7	1.550000	0	7.26710-	7	1.600000	0	6.39902-	8	126080803	2583
1.650000	0	5.77124-	8	1.700000	0	6.41032-	8	1.750000	0	1.19309-	7	126080803	2584
1.800000	0	3.24894-	8	1.850000	0	6.92114-	8	1.900000	0	3.18302-	8	126080803	2585
1.950000	0	9.78978-	8	2.000000	0	5.20592-	8	2.050000	0	2.04573-	8	126080803	2586
2.100000	0	5.73782-	8	2.150000	0	1.66398-	8	2.200000	0	3.86371-	8	126080803	2587
2.250000	0	5.21162-	8	2.300000	0	6.28314-	8	2.350000	0	1.43871-	8	126080803	2588
2.400000	0	5.23239-	8	2.450000	0	5.41236-	7	2.500000	0	5.95396-	8	126080803	2589
2.550000	0	1.80112-	7	2.600000	0	5.86366-	8	2.650000	0	1.34909-	8	126080803	2590
2.700000	0	1.39131-	7	2.750000	0	7.68465-	8	2.800000	0	5.34918-	8	126080803	2591
2.850000	0	7.95785-	8	2.900000	0	4.65150-	8	2.950000	0	6.39501-	8	126080803	2592
3.000000	0	1.18287-	8	3.050000	0	1.44865-	8	3.100000	0	2.70875-	8	126080803	2593
3.150000	0	1.05018-	8	3.200000	0	7.11011-	9	3.250000	0	4.77522-	9	126080803	2594
3.300000	0	1.01231-	8	3.350000	0	2.42213-	8	3.400000	0	3.07637-	8	126080803	2595
3.450000	0	8.34446-	9	3.500000	0	2.49382-	8	3.550000	0	1.50303-	7	126080803	2596
3.600000	0	4.09861-	8	3.650000	0	7.49189-	9	3.700000	0	1.79534-	8	126080803	2597
3.750000	0	1.56906-	8	3.800000	0	2.98617-	8	3.850000	0	1.20852-	9	126080803	2598
3.900000	0	6.00155-	9	3.950000	0	2.21000-	9	4.000000	0	9.22213-	10	126080803	2599
4.050000	0	6.98402-	8	4.100000	0	6.73739-	8	4.150000	0	6.64447-	10	126080803	2600
4.200000	0	4.53708-	9	4.250000	0	2.78431-	8	4.300000	0	1.33103-	9	126080803	2601
4.350000	0	2.50117-	8	4.400000	0	1.33227-	8	4.450000	0	8.22019-	9	126080803	2602
4.500000	0	8.14649-	9	4.550000	0	2.52395-	10	4.600000	0	2.97419-	8	126080803	2603
4.650000	0	9.01695-	11	4.700000	0	5.65034-	11	4.750000	0	3.52444-	10	126080803	2604
4.800000	0	2.21571-	8	4.850000	0	1.19310-	13	4.900000	0	1.16600-	8	126080803	2605
4.950000	0	1.17353-	9	5.000000	0	0.000000	0	5.050000	0	1.00406-	8	126080803	2606
5.100000	0	9.000000	0	5.150000	0	3.18536-	8	5.200000	0	2.47845-	8	126080803	2607
5.250000	0	9.37530-	10	5.300000	0	1.11285-	8	5.350000	0	6.94788-	9	126080803	2608
5.400000	0	9.08201-	9	5.450000	0	9.80578-	9	5.500000	0	7.01173-	9	126080803	2609
5.550000	0	3.06521-	8	5.600000	0	2.42486-	8	5.650000	0	0.000000	0	126080803	2610
5.700000	0	8.05154-	9	5.750000	0	0.000000	0	5.800000	0	0.000000	0	126080803	2611
5.850000	0	8.86221-	9	5.900000	0	1.18598-	8	5.950000	0	0.000000	0	126080803	2612
6.000000	0	1.81423-	8	6.050000	0	0.000000	0	6.100000	0	1.09730-	8	126080803	2613
6.150000	0	0.000000	0	6.200000	0	5.51089-	9	6.250000	0	0.000000	0	126080803	2614
0.	5.00000E+00			0				0	1	126126080803		2615	
0.000000	0	5.41561-	10	5.000000	2	1.08209-	8	1.000000	0	8.61764-	8	126080803	2616
1.500000	1	3.38740-	8	2.000000	1	5.55726-	8	2.500000	1	1.36872-	7	126080803	2617
3.000000	1	2.74005-	8	3.500000	1	1.27881-	7	4.000000	1	6.12505-	8	126080803	2618
4.500000	1	2.11218-	7	5.000000	1	5.20519-	7	5.500000	1	2.65879-	7	126080803	2619
6.000000	1	2.51344-	7	6.500000	1	4.59327-	8	7.000000	1	9.76018-	8	126080803	2620
7.500000	1	5.93754-	8	8.000000	1	2.90042-	7	8.500000	1	3.81432-	8	126080803	2621
9.000000	1	7.19973-	8	9.500000	1	1.23424-	7	1.000000	0	3.52827-	8	126080803	2622
1.050000	0	7.28555-	8	1.100000	0	5.51835-	7	1.150000	0	1.91931-	8	126080803	2623

1.20000*	0	1.07479-	7	1.25000*	0	1.32440-	7	1.30000*	0	2.20871-	7126080803	2026
1.35000*	0	4.19187-	8	1.40000*	0	3.42426-	7	1.45000*	0	8.58040-	8126080803	2027
1.50000*	0	1.07414-	7	1.55000*	0	7.10097-	8	1.60000*	0	4.22259-	8126080803	2028
1.65000*	0	3.50690-	8	1.70000*	0	3.56384-	8	1.75000*	0	6.87547-	8126080803	2029
1.80000*	0	2.10274-	8	1.85000*	0	3.93254-	8	1.90000*	0	2.09077-	8126080803	2030
1.95000*	0	0.21473-	8	2.00000*	0	2.16746-	8	2.05000*	0	1.15732-	8126080803	2031
2.10000*	0	3.57044-	8	2.15000*	0	1.15451-	8	2.20000*	0	2.44456-	8126080803	2032
2.25000*	0	3.39899-	8	2.30000*	0	4.13001-	8	2.35000*	0	1.21049-	8126080803	2033
2.40000*	0	3.14431-	8	2.45000*	0	6.05144-	8	2.50000*	0	3.94211-	8126080803	2034
2.55000*	0	1.17980-	7	2.60000*	0	3.65301-	8	2.65000*	0	8.51188-	9126080803	2035
2.70000*	0	0.59779-	8	2.75000*	0	4.82498-	8	2.80000*	0	2.35485-	8126080803	2036
2.85000*	0	4.86575-	8	2.90000*	0	2.42304-	8	2.95000*	0	4.21021-	9126080803	2037
3.00000*	0	1.85444-	9	3.05000*	0	8.58452-	9	3.10000*	0	1.51342-	8126080803	2038
3.15000*	0	4.43484-	9	3.20000*	0	4.73524-	9	3.25000*	0	3.07115-	9126080803	2039
3.30000*	0	1.11818-	8	3.35000*	0	2.46453-	8	3.40000*	0	2.05247-	8126080803	2040
3.45000*	0	5.67173-	9	3.50000*	0	1.70714-	8	3.55000*	0	1.01131-	7126080803	2041
3.60000*	0	2.75092-	8	3.65000*	0	3.56415-	9	3.70000*	0	1.18138-	8126080803	2042
3.75000*	0	1.05448-	8	3.80000*	0	1.93720-	8	3.85000*	0	9.03507-10	126080803	2043
3.90000*	0	4.48210-	9	3.95000*	0	5.16402-	9	4.00000*	0	6.22448-10	126080803	2044
4.05000*	0	4.07923-	8	4.10000*	0	4.58478-	8	4.15000*	0	4.51917-10	126080803	2045
4.20000*	0	2.53321-	9	4.25000*	0	2.54441-	8	4.30000*	0	9.68555-10	126080803	2046
4.35000*	0	1.42987-	8	4.40000*	0	5.56477-	9	4.45000*	0	5.61503-	9126080803	2047
4.50000*	0	3.77780-	9	4.55000*	0	1.70216-10	4.60000*	0	1.45607-	8126080803	2048	
4.65000*	0	0.52064-11	4.70000*	0	3.84129-11	4.75000*	0	2.37741-10	126080803	2049		
4.80000*	0	8.85618-	9	4.85000*	0	9.93254-14	4.90000*	0	4.60841-	9126080803	2050	
4.95000*	0	8.72073-10	5.00000*	0	0.00000*	5.05000*	0	4.17619-	9126080803	2051		
5.10000*	0	0.00000*	5.15000*	0	1.40785-	8	5.20000*	0	9.79562-	9126080803	2052	
5.25000*	0	7.25992-10	5.30000*	0	5.01066-	9	5.35000*	0	2.74692-	9126080803	2053	
5.40000*	0	0.41919-	9	5.45000*	0	3.89426-	9	5.50000*	0	5.01085-	9126080803	2054
5.55000*	0	1.18776-	8	5.60000*	0	9.58398-	9	5.65000*	0	0.00000*	0126080803	2055
5.70000*	0	3.41441-	9	5.75000*	0	0.00000*	5.80000*	0	0.00000*	0126080803	2056	
5.85000*	0	3.50266-	9	5.90000*	0	4.68745-	9	5.95000*	0	0.00000*	0126080803	2057
6.00000*	0	7.17034-	9	6.05000*	0	0.00000*	6.10000*	0	4.33645-	9126080803	2058	
6.15000*	0	0.00000*	6.20000*	0	1.79439-	9	6.25000*	0	0.00000*	0126080803	2059	
0.	126	1.00000E+01	0	0	0	0	1	126	126	126080803	2060	
0.00000*	0	4.54140-10	5.00000*	2	8.33129-	9	1.00000*	1	3.71102-	8126080803	2061	
1.50000*	0	2.34575-	8	2.00000*	1	3.89077-	8	2.50000*	1	8.16332-	8126080803	2062
3.00000*	1	1.73673-	8	3.50000*	1	7.82809-	8	4.00000*	1	3.15504-	8126080803	2063
4.50000*	1	8.19035-	8	5.00000*	1	2.45047-	7	5.50000*	1	1.03435-	7126080803	2064
6.00000*	1	1.57465-	7	6.50000*	1	3.31492-	8	7.00000*	1	6.43714-	8126080803	2065
7.50000*	1	3.00020-	8	8.00000*	1	9.64470-	8	8.50000*	1	2.78215-	8126080803	2066
9.00000*	1	5.17103-	8	9.50000*	1	7.64082-	8	1.00000*	0	2.64036-	8126080803	2067
1.05000*	0	4.51720-	8	1.10000*	0	1.71224-	7	1.15000*	0	1.43248-	8126080803	2068
1.20000*	0	5.42753-	8	1.25000*	0	7.32562-	8	1.30000*	0	1.61893-	7126080803	2069
1.35000*	0	3.00448-	8	1.40000*	0	2.53466-	7	1.45000*	0	6.07769-	8126080803	2070
1.50000*	0	7.48324-	8	1.55000*	0	5.02849-	8	1.60000*	0	3.29789-	8126080803	2071
1.65000*	0	2.67682-	8	1.70000*	0	2.42039-	8	1.75000*	0	4.84357-	8126080803	2072
1.80000*	0	1.62178-	8	1.85000*	0	2.80850-	8	1.90000*	0	1.62729-	8126080803	2073
1.95000*	0	4.76678-	8	2.00000*	0	2.37004-	8	2.05000*	0	8.49306-	9126080803	2074
2.10000*	0	2.08047-	8	2.15000*	0	9.30278-	9	2.20000*	0	1.83383-	8126080803	2075
2.25000*	0	2.02214-	8	2.30000*	0	3.20254-	8	2.35000*	0	9.12482-	9126080803	2076
2.40000*	0	2.33662-	8	2.45000*	0	3.38463-	8	2.50000*	0	3.05022-	8126080803	2077
2.55000*	0	4.21337-	8	2.60000*	0	2.67481-	8	2.65000*	0	6.19843-	9126080803	2078
2.70000*	0	4.06609-	8	2.75000*	0	3.68762-	8	2.80000*	0	1.30235-	8126080803	2079
2.85000*	0	3.51355-	8	2.90000*	0	2.20097-	9	2.95000*	0	3.26242-	9126080803	2080
3.00000*	0	6.05843-	9	3.05000*	0	6.47423-	9	3.10000*	0	1.06609-	8126080803	2081
3.15000*	0	2.40803-	9	3.20000*	0	3.64186-	9	3.25000*	0	2.43545-	9126080803	2082
3.30000*	0	4.14242-	9	3.35000*	0	2.02241-	8	3.40000*	0	1.60841-	8126080803	2083
3.45000*	0	4.45619-	9	3.50000*	0	7.35743-	8	3.55000*	0	7.97786-	8126080803	2084
3.60000*	0	2.16526-	8	3.65000*	0	5.24411-	9	3.70000*	0	9.26847-	9126080803	2085
3.75000*	0	8.28995-	9	3.80000*	0	1.49282-	8	3.85000*	0	7.54235-10	126080803	2086
3.90000*	0	3.53362-	9	3.95000*	0	1.71444-	9	4.00000*	0	4.92717-10	126080803	2087
4.05000*	0	3.70674-	8	4.10000*	0	3.65068-	8	4.15000*	0	3.56410-10	126080803	2088
4.20000*	0	1.02150-	9	4.25000*	0	2.00543-	8	4.30000*	0	7.97742-10	126080803	2089
4.35000*	0	1.03359-	8	4.40000*	0	2.71282-	9	4.45000*	0	4.46846-	9126080803	2090
4.50000*	0	2.14046-	9	4.55000*	0	1.33002-10	4.60000*	0	8.81105-	9126080803	2091	
4.65000*	0	5.25474-11	4.70000*	0	2.06117-11	4.75000*	0	1.85749-10	126080803	2092		

4.80000+	0	4.04240-	9	4.85000+	0	9.14824-14	4.90000+	0	2.06196-	9126080803	2094	
4.95000+	0	7.23047-10	5.00000+	0	0.00000+	0	5.05000+	0	2.03803-	9126080803	2095	
5.10000+	0	0.00000+	0	5.15000+	0	7.51731-	9	5.20000+	0	4.34240-	9126080803	2096
5.25000+	0	5.15654-10	5.30000+	0	2.74290-	9	5.35000+	0	1.22806-	9126080803	2097	
5.40000+	0	5.08971-	9	5.45000+	0	1.74465-	9	5.50000+	0	4.12047-	9126080803	2098
5.55000+	0	5.31243-	9	5.60000+	0	4.28521-	9	5.65000+	0	0.00000+	9126080803	2099
5.70000+	0	1.52996-	9	5.75000+	0	0.00000+	0	5.80000+	0	0.00000+	9126080803	2100
5.85000+	0	1.56720-	9	5.90000+	0	2.05733-	9	5.95000+	0	0.00000+	9126080803	2101
6.00000+	0	3.20824-	9	6.05000+	0	0.00000+	0	6.10000+	0	1.94031-	9126080803	2102
6.15000+	0	0.00000+	0	6.20000+	0	1.47556-	9	6.25000+	0	0.00000+	9126080803	2103
0.	126	5.0000E+01	1	0	0	0	1	126126080803	2104	9126080803	2105	
0.00000+	0	2.55596-10	5.00000+	2	3.24122-	9	1.00000-	1	5.28984-	9126080803	2106	
1.50000-	1	7.53818-	9	2.00000-	1	1.15206-	8	2.50000-	1	1.21877-	8126080803	2107
3.00000-	1	7.81576-	9	3.50000-	1	1.34138-	8	4.00000-	1	8.74547-	9126080803	2108
4.50000-	1	1.24013-	8	5.00000-	1	2.01761-	8	5.50000-	1	1.50522-	8126080803	2109
6.00000-	1	3.04850-	8	6.50000-	1	1.09726-	8	7.00000-	1	1.91172-	8126080803	2110
7.50000-	1	8.70752-	9	8.00000-	1	2.32146-	8	8.50000-	1	1.17850-	8126080803	2111
9.00000-	1	1.92832-	8	9.50000-	1	1.81032-	8	1.00000+	0	1.21250-	8126080803	2112
1.05000+	0	1.02726-	8	1.10000+	0	4.63253-	8	1.15000+	0	5.19075-	9126080803	2113
1.20000+	0	1.51043-	8	1.25000+	0	9.65372-	9	1.30000+	0	5.60746-	8126080803	2114
1.35000+	0	1.28251-	8	1.40000+	0	9.31378-	8	1.45000+	0	2.01833-	8126080803	2115
1.50000+	0	2.25472-	8	1.55000+	0	1.76413-	8	1.60000+	0	1.33247-	8126080803	2116
1.65000+	0	1.04871-	8	1.70000+	0	6.55330-	9	1.75000+	0	1.52368-	8126080803	2117
1.80000+	0	0.72004-	9	1.85000+	0	8.86835-	9	1.90000+	0	6.69616-	9126080803	2118
1.95000+	0	1.87439-	8	2.00000+	0	9.56000-	9	2.05000+	0	3.24034-	9126080803	2119
2.10000+	0	1.00478-	8	2.15000+	0	4.67390-	9	2.20000+	0	6.97338-	9126080803	2120
2.25000+	0	1.04091-	8	2.30000+	0	1.28882-	8	2.35000+	0	3.56932-	9126080803	2121
2.40000+	0	8.48186-	9	2.45000+	0	4.20455-	9	2.50000+	0	1.18223-	8126080803	2122
2.55000+	0	3.73189-	8	2.60000+	0	7.85551-	9	2.65000+	0	1.75023-	9126080803	2123
2.70000+	0	7.91631-	9	2.75000+	0	1.54244-	8	2.80000+	0	2.54708-	9126080803	2124
2.85000+	0	1.00560-	8	2.90000+	0	8.20004-	9	2.95000+	0	1.29344-	9126080803	2125
3.00000+	0	2.35778-	9	3.05000+	0	2.53443-	9	3.10000+	0	4.05539-	9126080803	2126
3.15000+	0	1.02020-	9	3.20000+	0	1.52515-	9	3.25000+	0	1.24051-	9126080803	2127
3.30000+	0	5.10109-	9	3.35000+	0	1.08317-	8	3.40000+	0	6.47220-	9126080803	2128
3.45000+	0	1.82773-	9	3.50000+	0	7.10543-	9	3.55000+	0	3.28049-	8126080803	2129
3.60000+	0	8.81799-	9	3.65000+	0	6.68713-10	9	3.70000+	0	3.90744-	9126080803	2130
3.75000+	0	3.37531-	9	3.80000+	0	6.12314-	9	3.85000+	0	4.33963-10	9126080803	2131
3.90000+	0	1.54606-	9	3.95000+	0	8.04019-10	9	4.00000+	0	2.25071-10	9126080803	2132
4.05000+	0	1.52752-	8	4.10000+	0	1.70121-	8	4.15000+	0	1.58003-10	9126080803	2133
4.20000+	0	5.36061-10	4.25000+	0	8.25138-	9	4.30000+	0	4.37602-10	9126080803	2134	
4.35000+	0	9.85886-	9	4.40000+	0	2.40479-10	9	4.45000+	0	1.96786-	9126080803	2135
4.50000+	0	4.33270-10	4.55000+	0	5.28197-11	9	4.60000+	0	3.00104-	9126080803	2136	
4.65000+	0	2.45490-11	4.70000+	0	1.47311-11	9	4.75000+	0	7.37674-11	9126080803	2137	
4.80000+	0	1.27274-10	4.85000+	0	7.50792-14	9	4.90000+	0	2.83872-11	9126080803	2138	
4.95000+	0	3.48732-10	5.00000+	0	0.00000+	0	5.05000+	0	2.41920-10	9126080803	2139	
5.10000+	0	0.00000+	0	5.15000+	0	1.63522-	9	5.20000+	0	6.03308-11	9126080803	2140
5.25000+	0	3.74177-10	5.30000+	0	6.67705-10	9	5.35000+	0	1.63145-11	9126080803	2141	
5.40000+	0	2.80734-	9	5.45000+	0	2.40202-11	9	5.50000+	0	2.03395-	9126080803	2142
5.55000+	0	7.31645-11	5.60000+	0	5.40371-11	9	5.65000+	0	0.00000+	9126080803	2143	
5.70000+	0	2.10642-11	5.75000+	0	0.00000+	0	5.80000+	0	0.00000+	9126080803	2144	
5.85000+	0	2.15760-11	5.90000+	0	2.88715-11	9	5.95000+	0	0.00000+	9126080803	2145	
6.00000+	0	4.41670-11	6.05000+	0	0.00000+	0	6.10000+	0	2.67100-11	9126080803	2146	
6.15000+	0	0.00000+	0	6.20000+	0	7.28066-10	9	6.25000+	0	0.00000+	9126080803	2147
0.	126	1.0000E+02	1	0	0	0	1	126126080803	2148	9126080803	2149	
0.00000+	0	1.87693-10	5.00000+	2	1.68043-	9	1.00000-	1	1.75481-	9126080803	2150	
1.50000-	1	3.91797-	9	2.00000-	1	4.75588-	9	2.50000-	1	6.24475-	9126080803	2151
3.00000-	1	4.71039-	9	3.50000-	1	5.62729-	9	4.00000-	1	5.46921-	9126080803	2152
4.50000-	1	7.97275-	9	5.00000-	1	6.16519-	9	5.50000-	1	8.86403-	9126080803	2153
6.00000-	1	1.04218-	8	6.50000-	1	5.76421-	9	7.00000-	1	1.14078-	8126080803	2154
7.50000-	1	4.33211-	9	8.00000-	1	1.62865-	8	8.50000-	1	7.94217-	9126080803	2155
9.00000-	1	1.21170-	8	9.50000-	1	9.88408-	9	1.00000+	0	7.95223-	9126080803	2156
1.05000+	0	0.04830-	9	1.10000+	0	1.84395-	8	1.15000+	0	2.77243-	9126080803	2157
1.20000+	0	8.41297-	9	1.25000+	0	4.95019-	9	1.30000+	0	2.66757-	8126080803	2158
1.35000+	0	7.83345-	9	1.40000+	0	4.72401-	8	1.45000+	0	9.93048-	9126080803	2159
1.50000+	0	1.00710-	8	1.55000+	0	8.50098-	9	1.60000+	0	6.55089-	9126080803	2160
1.65000+	0	6.27582-	9	1.70000+	0	3.11835-	9	1.75000+	0	6.61532-	9126080803	2161

1.800000+	0	3.57978-	9	1.850000+	0	4.25373-	9	1.900000+	0	3.54927-	9	126080803	2762
1.450000+	0	8.76561-	9	2.000000+	0	5.77282-	9	2.050000+	0	1.68404-	9	126080803	2763
2.100000+	0	5.11052-	9	2.150000+	0	3.30991-	9	2.200000+	0	3.77414-	9	126080803	2764
2.250000+	0	5.50514-	9	2.300000+	0	6.23327-	9	2.350000+	0	2.09744-	9	126080803	2765
2.400000+	0	4.23147-	9	2.450000+	0	1.72016-	9	2.500000+	0	5.92610-	9	126080803	2766
2.550000+	0	1.78258-	9	2.600000+	0	3.91447-	9	2.650000+	0	9.27456-	10	126080803	2767
2.700000+	0	3.12087-	9	2.750000+	0	8.55946-	9	2.800000+	0	1.42492-	9	126080803	2768
2.850000+	0	4.01303-	9	2.900000+	0	3.74833-	9	2.950000+	0	6.46097-	10	126080803	2769
3.000000+	0	1.09309-	9	3.050000+	0	1.21883-	9	3.100000+	0	2.51744-	9	126080803	2770
3.150000+	0	5.05060-	10	3.200000+	0	8.22794-	10	3.250000+	0	8.64595-	10	126080803	2771
3.300000+	0	3.84110-	9	3.350000+	0	7.94194-	9	3.400000+	0	3.01718-	9	126080803	2772
3.450000+	0	9.30941-	10	3.500000+	0	5.29268-	9	3.550000+	0	1.55880-	8	126080803	2773
3.600000+	0	4.13251-	9	3.650000+	0	4.01388-	10	3.700000+	0	2.03507-	9	126080803	2774
3.750000+	0	1.01205-	9	3.800000+	0	3.12841-	9	3.850000+	0	3.35531-	10	126080803	2775
3.900000+	0	9.04953-	10	3.950000+	0	5.34575-	10	4.000000+	0	1.43757-	10	126080803	2776
4.050000+	0	7.28344-	9	4.100000+	0	1.05392-	8	4.150000+	0	9.58523-	11	126080803	2777
4.200000+	0	3.73937-	10	4.250000+	0	3.91523-	9	4.300000+	0	3.27808-	10	126080803	2778
4.350000+	0	7.82022-	9	4.400000+	0	1.08126-	10	4.450000+	0	1.07622-	9	126080803	2779
4.500000+	0	2.01556-	10	4.550000+	0	2.52444-	11	4.600000+	0	2.35008-	9	126080803	2780
4.650000+	0	1.92798-	11	4.700000+	0	1.00534-	11	4.750000+	0	3.52559-	11	126080803	2781
4.800000+	0	4.12709-	11	4.850000+	0	7.11707-	14	4.900000+	0	3.10802-	12	126080803	2782
4.950000+	0	2.93364-	10	5.000000+	0	0.00000+	0	5.050000+	0	1.76970-	10	126080803	2783
5.100000+	0	0.00000+	0	5.150000+	0	1.25689-	9	5.200000+	0	6.60844-	12	126080803	2784
5.250000+	0	2.98302-	10	5.300000+	0	5.16384-	10	5.350000+	0	1.85212-	12	126080803	2785
5.400000+	0	1.42417-	9	5.450000+	0	2.62991-	12	5.500000+	0	1.03137-	9	126080803	2786
5.550000+	0	8.01117-	12	5.600000+	0	6.46399-	12	5.650000+	0	0.00000+	0	126080803	2787
5.700000+	0	2.30640-	12	5.750000+	0	0.00000+	0	5.800000+	0	0.00000+	0	126080803	2788
5.850000+	0	2.36259-	12	5.900000+	0	3.16101-	12	5.950000+	0	0.00000+	0	126080803	2789
6.000000+	0	4.83577-	12	6.050000+	0	0.00000+	0	6.100000+	0	2.92510-	12	126080803	2790
6.150000+	0	0.00000+	0	6.200000+	0	3.69350-	10	6.250000+	0	0.00000+	0	126080803	2791
0.	0	5.00000E+02	0	0	0	0	0	1	0	126126080803	2792		
0.000000+	0	0.30070-	11	5.000000-	2	2.00888-	10	1.000000-	1	1.63892-	10	126080803	2793
1.500000-	1	9.84649-	10	3.000000-	1	5.48355-	10	2.500000-	1	1.43580-	9	126080803	2795
3.000000-	1	1.81600-	10	3.500000-	1	6.90321-	10	2.000000-	1	1.62502-	9	126080803	2796
4.500000-	1	2.60711-	9	5.000000-	1	7.05407-	10	5.500000-	1	2.93851-	9	126080803	2797
6.000000-	1	1.35381-	9	6.500000-	1	1.19861-	9	7.000000-	1	2.78693-	9	126080803	2798
7.500000-	1	1.48539-	9	8.000000-	1	4.64748-	9	8.500000-	1	3.53036-	9	126080803	2799
9.000000-	1	5.11461-	9	9.500000-	1	1.67290-	9	1.000000+	0	4.07574-	9	126080803	2800
1.050000+	0	1.54734-	9	1.100000+	0	2.05326-	9	1.150000+	0	7.64943-	10	126080803	2801
1.200000+	0	3.58867-	9	1.250000+	0	1.52068-	9	1.300000+	0	1.51475-	9	126080803	2802
1.350000+	0	2.09818-	9	1.400000+	0	2.74585-	9	1.450000+	0	8.54398-	10	126080803	2803
1.500000+	0	1.43809-	9	1.550000+	0	3.82532-	10	1.600000+	0	5.82747-	10	126080803	2804
1.650000+	0	1.80922-	9	1.700000+	0	2.37436-	10	1.750000+	0	1.28143-	9	126080803	2805
1.800000+	0	5.75901-	10	1.850000+	0	6.74663-	10	1.900000+	0	5.59683-	10	126080803	2806
1.950000+	0	2.04151-	10	2.000000+	0	2.09888-	9	2.050000+	0	2.53607-	10	126080803	2807
2.100000+	0	7.04660-	10	2.150000+	0	1.84421-	9	2.200000+	0	6.63834-	10	126080803	2808
2.250000+	0	5.45480-	10	2.300000+	0	2.49790-	10	2.350000+	0	8.46549-	10	126080803	2809
2.400000+	0	2.29545-	10	2.450000+	0	2.95265-	10	2.500000+	0	6.55286-	10	126080803	2810
2.550000+	0	1.39778-	9	2.600000+	0	6.40053-	10	2.650000+	0	3.05736-	10	126080803	2811
2.700000+	0	2.00834-	10	2.750000+	0	1.04935-	9	2.800000+	0	3.07852-	10	126080803	2812
2.850000+	0	3.96649-	10	2.900000+	0	4.74286-	11	2.950000+	0	8.10226-	11	126080803	2813
3.000000+	0	3.39487-	10	3.050000+	0	2.19565-	11	3.100000+	0	5.80893-	10	126080803	2814
3.150000+	0	3.57645-	11	3.200000+	0	1.14834-	10	3.250000+	0	1.82005-	10	126080803	2815
3.300000+	0	1.03444-	9	3.350000+	0	1.47031-	9	3.400000+	0	5.36092-	11	126080803	2816
3.450000+	0	8.05190-	11	3.500000+	0	1.16478-	9	3.550000+	0	6.17776-	10	126080803	2817
3.600000+	0	9.39791-	11	3.650000+	0	8.13321-	11	3.700000+	0	1.69120-	10	126080803	2818
3.750000+	0	4.42039-	11	3.800000+	0	1.76801-	10	3.850000+	0	6.99740-	11	126080803	2819
3.900000+	0	2.16971-	10	3.950000+	0	1.08105-	10	4.000000+	0	2.63193-	11	126080803	2820
4.050000+	0	1.76070-	10	4.100000+	0	1.26025-	9	4.150000+	0	1.45956-	11	126080803	2821
4.200000+	0	8.79478-	11	4.250000+	0	8.06920-	11	4.300000+	0	6.25346-	11	126080803	2822
4.350000+	0	1.46177-	9	4.400000+	0	4.08140-	12	4.450000+	0	8.80930-	11	126080803	2823
4.500000+	0	2.32991-	12	4.550000+	0	2.94114-	13	4.600000+	0	4.40877-	10	126080803	2824
4.650000+	0	3.20319-	12	4.700000+	0	5.85279-	12	4.750000+	0	4.10763-	13	126080803	2825
4.800000+	0	4.15837-	13	4.850000+	0	7.97652-	14	4.900000+	0	1.45502-	13	126080803	2826
4.950000+	0	4.06747-	11	5.000000+	0	0.00000+	0	5.050000+	0	3.27910-	11	126080803	2827

5.100000+	0	0.000000+	0	5.150000+	0	2.34568-10	5.20000+	0	2.09285-10	126080803	2828
5.250000+	0	5.50727-11	5.300000+	0	6.65918-11	5.35000+	0	8.66803-16	126080803	2829	
5.400000+	0	9.43865-12	5.450000+	0	1.23096-15	5.50000+	0	6.83532-14	126080803	2830	
5.550000+	0	3.14957-15	5.600000+	0	3.02581-15	5.65000+	0	0.000000+	0126080803	2831	
5.700000+	0	1.07945-15	5.750000+	0	0.000000+	5.80000+	0	0.000000+	0126080803	2832	
5.850000+	0	1.10585-15	5.900000+	0	1.48003-15	5.95000+	0	0.000000+	0126080803	2833	
6.000000+	0	2.26402-15	6.050000+	0	0.000000+	6.10000+	0	1.36906-15	126080803	2834	
6.150000+	0	0.000000+	6.200000+	0	2.44777-12	6.25000+	0	0.000000+	0126080803	2835	
0.	126	1.00000E+03	0	0	0	1	126126080803	2836			
0.000000+	0	2.82372-11	5.000000-	2	8.00217-11	1.00000-	1	1.06750-10	126080803	2837	
1.500000-	1	5.92973-10	2.000000-	1	2.67171-10	2.50000-	1	6.83747-10	126080803	2838	
3.000000-	1	1.30148-9	3.500000-	1	3.69838-10	4.00000-	1	7.86714-10	126080803	2839	
4.500000-	1	1.32724-9	5.000000-	1	5.19360-10	5.50000-	1	1.39295-9	0126080803	2840	
6.000000-	1	8.96740-10	6.500000-	1	5.64274-10	7.00000-	1	1.16250-9	0126080803	2841	
7.500000-	1	1.04414-9	8.000000-	1	1.97667-9	8.50000-	1	2.14141-9	0126080803	2842	
9.000000-	1	3.51666-9	9.500000-	1	5.94984-10	1.00000+	0	2.99105-9	0126080803	2843	
1.050000+	0	6.86198-10	1.100000+	0	1.01069-9	1.15000+	0	4.58056-10	126080803	2844	
1.200000+	0	2.45465-9	1.250000+	0	8.17584-10	1.30000+	0	5.74642-10	126080803	2845	
1.350000+	0	1.25259-9	1.400000+	0	1.37667-9	1.45000+	0	3.23236-10	126080803	2846	
1.500000+	0	8.28323-10	1.550000+	0	1.95300-10	1.60000+	0	2.88974-10	126080803	2847	
1.650000+	0	8.33942-10	1.700000+	0	5.94134-10	1.75000+	0	7.71131-10	126080803	2848	
1.800000+	0	3.45255-10	1.850000+	0	4.20418-10	1.90000+	0	3.13248-10	126080803	2849	
1.950000+	0	7.13253-11	2.000000+	0	1.34498-9	2.05000+	0	1.79303-10	126080803	2850	
2.100000+	0	2.76721-10	2.150000+	0	1.34314-9	2.20000+	0	4.91370-10	126080803	2851	
2.250000+	0	2.59771-10	2.300000+	0	1.14639-10	2.35000+	0	6.90742-10	126080803	2852	
2.400000+	0	4.16125-11	2.450000+	0	1.85066-10	2.50000+	0	3.71753-10	126080803	2853	
2.550000+	0	9.76042-10	2.600000+	0	3.91841-10	2.65000+	0	1.74504-10	126080803	2854	
2.700000+	0	1.74318-10	2.750000+	0	2.45417-10	2.80000+	0	1.51756-10	126080803	2855	
2.850000+	0	5.77193-11	2.900000+	0	5.00117-12	2.95000+	0	7.96489-11	126080803	2856	
3.000000+	0	1.13230-10	3.050000+	0	4.56829-12	3.10000+	0	1.61303-10	126080803	2857	
3.150000+	0	1.35954-11	3.200000+	0	6.11526-11	3.25000+	0	5.82113-11	126080803	2858	
3.300000+	0	2.79883-10	3.350000+	0	2.64902-10	3.40000+	0	1.88777-11	126080803	2859	
3.450000+	0	4.20450-11	3.500000+	0	2.85563-10	3.55000+	0	2.64405-10	126080803	2860	
3.600000+	0	4.75095-11	3.650000+	0	3.3472-11	3.70000+	0	3.58270-11	126080803	2861	
3.750000+	0	9.05423-12	3.800000+	0	2.75093-11	3.85000+	0	1.59340-11	126080803	2862	
3.900000+	0	1.38002-10	3.950000+	0	3.04829-11	4.00000+	0	5.32778-12	126080803	2863	
4.050000+	0	2.99783-11	4.100000+	0	1.64012-10	4.15000+	0	2.37326-12	126080803	2864	
4.200000+	0	2.26812-11	4.250000+	0	7.41582-12	4.30000+	0	8.93317-12	126080803	2865	
4.350000+	0	1.92896-10	4.400000+	0	5.16816-13	4.45000+	0	1.18382-11	126080803	2866	
4.500000+	0	3.15750-14	4.550000+	0	3.98267-15	4.60000+	0	5.83204-11	126080803	2867	
4.650000+	0	5.29883-13	4.700000+	0	1.56173-12	4.75000+	0	5.56237-15	126080803	2868	
4.800000+	0	5.72154-15	4.850000+	0	9.51299-14	4.90000+	0	6.80320-17	126080803	2869	
4.950000+	0	6.26708-12	5.000000+	0	0.000000+	5.05000+	0	4.32327-14	126080803	2870	
5.100000+	0	0.000000+	5.150000+	0	3.09661-11	5.20000+	0	1.44639-10	126080803	2871	
5.250000+	0	7.39288-12	5.300000+	0	1.27352-11	5.35000+	0	4.05379-17	126080803	2872	
5.400000+	0	7.45981-14	5.450000+	0	5.75577-17	5.50000+	0	5.39586-14	126080803	2873	
5.550000+	0	1.75320-16	5.600000+	0	1.41486-16	5.65000+	0	0.000000+	0126080803	2874	
5.700000+	0	5.04810-17	5.750000+	0	0.000000+	5.80000+	0	0.000000+	0126080803	2875	
5.850000+	0	5.17124-17	5.900000+	0	6.92272-17	5.95000+	0	0.000000+	0126080803	2876	
6.000000+	0	1.02874-16	6.050000+	0	0.000000+	6.10000+	0	6.40240-17	126080803	2877	
6.150000+	0	0.000000+	6.200000+	0	1.93214-14	6.25000+	0	0.000000+	0126080803	2878	
0.	126	5.00000E+03	0	0	0	1	126126080803	2879			
0.000000+	0	1.26821-12	5.000000-	2	8.95740-12	1.00000-	1	3.13586-11	126080803	2880	
1.500000-	1	1.00612-10	2.000000-	1	4.41612-11	2.50000-	1	5.91235-11	126080803	2881	
3.000000-	1	1.86129-10	3.500000-	1	3.11586-11	4.00000-	1	1.43930-10	126080803	2882	
4.500000-	1	2.41434-10	5.000000-	1	1.24657-10	5.50000-	1	1.25069-10	126080803	2883	
6.000000-	1	2.85468-10	6.500000-	1	1.12059-10	7.00000-	1	2.15425-10	126080803	2884	
7.500000-	1	2.80445-10	8.000000-	1	5.98761-10	8.50000-	1	5.28409-10	126080803	2885	
9.000000-	1	4.93951-10	9.500000-	1	8.52061-11	1.00000+	0	3.72604-10	126080803	2886	
1.050000+	0	1.03764-10	1.100000+	0	1.78244-10	1.15000+	0	5.61759-11	126080803	2887	
1.200000+	0	1.26851-10	1.250000+	0	9.21882-11	1.30000+	0	4.78838-11	126080803	2888	
1.350000+	0	4.96629-10	1.400000+	0	5.43759-10	1.45000+	0	7.42738-11	126080803	2889	
1.500000+	0	2.23397-10	1.550000+	0	2.22341-11	1.60000+	0	5.48553-11	126080803	2890	
1.650000+	0	8.45036-11	1.700000+	0	7.68282-11	1.75000+	0	8.44352-11	126080803	2891	
1.800000+	0	1.7146-10	1.850000+	0	5.80255-11	1.90000+	0	9.57053-11	126080803	2892	
1.950000+	0	1.03103-11	2.000000+	0	1.78840-10	2.05000+	0	5.34811-11	126080803	2893	

2.100000	0	3.00483-11	2.150000	0	2.00533-10	2.200000	0	1.92708-10126080803	2896
2.250000	0	2.57611-11	2.300000	0	2.15707-12	2.350000	0	4.41747-10126080803	2897
2.400000	0	5.94715-12	2.450000	0	4.28653-11	2.500000	0	1.44302-10126080803	2898
2.550000	0	1.52042-10	2.600000	0	1.05429-10	2.650000	0	5.54234-11126080803	2899
2.700000	0	1.11957-11	2.750000	0	7.47287-12	2.800000	0	3.31929-11126080803	2900
2.850000	0	2.05783-13	2.900000	0	3.88703-13	2.950000	0	6.14180-11126080803	2901
3.000000	0	3.92572-11	3.050000	0	2.41241-12	3.100000	0	1.90469-11126080803	2902
3.150000	0	7.35739-12	3.200000	0	1.88129-11	3.250000	0	2.87548-12126080803	2903
3.300000	0	2.79996-11	3.350000	0	1.63786-11	3.400000	0	6.43427-12126080803	2904
3.450000	0	8.41849-12	3.500000	0	6.35297-12	3.550000	0	3.47547-12126080803	2905
3.600000	0	3.28903-11	3.650000	0	4.21307-13	3.700000	0	6.16472-12126080803	2906
3.750000	0	1.06541-13	3.800000	0	2.27265-13	3.850000	0	4.40534-12126080803	2907
3.900000	0	2.93843-11	3.950000	0	1.11122-12	4.000000	0	1.05438-12126080803	2908
4.050000	0	2.13408-12	4.100000	0	3.17903-13	4.150000	0	4.03400-15126080803	2909
4.200000	0	3.18956-14	4.250000	0	1.32522-14	4.300000	0	1.59309-14126080803	2910
4.350000	0	3.53904-13	4.400000	0	8.96249-16	4.450000	0	2.11370-14126080803	2911
4.500000	0	6.05585-17	4.550000	0	6.46541-18	4.600000	0	1.42527-13126080803	2912
4.650000	0	9.00929-16	4.700000	0	1.49053-12	4.750000	0	9.03016-15126080803	2913
4.800000	0	4.22600-17	4.850000	0	1.12025-13	4.900000	0	1.77397-17126080803	2914
4.950000	0	1.16875-14	5.000000	0	0.00000+0	5.050000	0	7.94879-15126080803	2915
5.100000	0	0.00000+0	5.150000	0	5.68735-14	5.200000	0	3.77106-17126080803	2916
5.250000	0	1.35643-14	5.300000	0	2.33880-14	5.350000	0	1.05715-17126080803	2917
5.400000	0	7.29198-17	5.450000	0	1.50164-17	5.500000	0	6.72951-17126080803	2918
5.550000	0	4.57216-17	5.600000	0	3.68954-17	5.650000	0	0.00000+0126080803	2919
5.700000	0	1.31646-17	5.750000	0	0.00000+0	5.800000	0	0.00000+0126080803	2920
5.850000	0	1.34875-17	5.900000	0	7.80497-17	5.950000	0	0.00000+0126080803	2921
6.000000	0	2.76091-17	6.050000	0	0.00000+0	6.100000	0	1.66931-17126080803	2922
6.150000	0	0.00000+0	6.200000	0	2.40795-17	6.250000	0	0.00000+0126080803	2923
0.	126	1.00000E+04	0	0	0	1	0	126126080803	2924
0.000000	0	3.25375-13	5.000000	2	2.77801-12	1.000000	1	8.11544-12126080803	2925
1.500000	1	3.90014-11	2.000000	1	2.36695-11	2.500000	1	1.81949-11126080803	2926
3.000000	1	2.86895-11	3.500000	1	7.90357-12	4.000000	1	5.87511-11126080803	2927
4.500000	1	4.22550-11	5.000000	1	6.20589-11	5.500000	1	6.33547-11126080803	2928
6.000000	1	1.24284-10	6.500000	1	7.77346-11	7.000000	1	1.02607-10126080803	2929
7.500000	1	8.07049-11	8.000000	1	2.71241-10	8.500000	1	2.28749-10126080803	2930
9.000000	1	1.26488-10	9.500000	1	4.39150-11	1.000000	0	1.11242-10126080803	2931
1.050000	0	4.41570-11	1.100000	0	8.52774-11	1.150000	0	1.87144-11126080803	2932
1.200000	0	1.08639-11	1.250000	0	5.25773-11	1.300000	0	1.01965-11126080803	2933
1.350000	0	3.21444-10	1.400000	0	1.10382-10	1.450000	0	3.05371-11126080803	2934
1.500000	0	1.56869-11	1.550000	0	6.07858-12	1.600000	0	2.34149-11126080803	2935
1.650000	0	3.43622-11	1.700000	0	3.63042-11	1.750000	0	3.56300-11126080803	2936
1.800000	0	1.14707-10	1.850000	0	1.07791-11	1.900000	0	4.93287-11126080803	2937
1.950000	0	2.22974-12	2.000000	0	6.37551-11	2.050000	0	2.44587-11126080803	2938
2.100000	0	1.37819-11	2.150000	0	9.77758-11	2.200000	0	4.73544-11126080803	2939
2.250000	0	4.33354-12	2.300000	0	7.81408-12	2.350000	0	2.75508-10126080803	2940
2.400000	0	3.20434-12	2.450000	0	7.27759-11	2.500000	0	7.74575-11126080803	2941
2.550000	0	4.96264-11	2.600000	0	1.90239-11	2.650000	0	3.26873-11126080803	2942
2.700000	0	1.42481-12	2.750000	0	3.47325-12	2.800000	0	1.39923-11126080803	2943
2.850000	0	7.06934-14	2.900000	0	5.77085-14	2.950000	0	3.28534-11126080803	2944
3.000000	0	1.82849-11	3.050000	0	1.18558-12	3.100000	0	5.82648-14126080803	2945
3.150000	0	3.90571-12	3.200000	0	7.60362-12	3.250000	0	1.21312-12126080803	2946
3.300000	0	1.35567-11	3.350000	0	2.64155-12	3.400000	0	3.02247-12126080803	2947
3.450000	0	4.57164-12	3.500000	0	1.88005-13	3.550000	0	2.14027-14126080803	2948
3.600000	0	1.74133-11	3.650000	0	2.59080-14	3.700000	0	3.19658-12126080803	2949
3.750000	0	1.77451-15	3.800000	0	4.51041-15	3.850000	0	2.35505-12126080803	2950
3.900000	0	4.76924-12	3.950000	0	5.45336-13	4.000000	0	5.90306-13126080803	2951
4.050000	0	2.86370-13	4.100000	0	7.98841-15	4.150000	0	6.85974-17126080803	2952
4.200000	0	5.28222-16	4.250000	0	2.51781-15	4.300000	0	2.71947-10126080803	2953
4.350000	0	6.06044-15	4.400000	0	3.41033-17	4.450000	0	3.65257-16126080803	2954
4.500000	0	1.17209-17	4.550000	0	2.23124-19	4.600000	0	2.80979-14126080803	2955
4.650000	0	1.52744-17	4.700000	0	1.09709-12	4.750000	0	4.51213-14126080803	2956
4.800000	0	3.29496-17	4.850000	0	8.24822-14	4.900000	0	1.73746-17126080803	2957
4.950000	0	2.00465-16	5.000000	0	0.00000+0	5.050000	0	1.50030-15126080803	2958
5.100000	0	0.00000+0	5.150000	0	1.01489-15	5.200000	0	3.69404-17126080803	2959
5.250000	0	2.32358-16	5.300000	0	4.14465-16	5.350000	0	1.03539-17126080803	2960
5.400000	0	7.66365-18	5.450000	0	1.47074-17	5.500000	0	5.54876-18126080803	2961
5.550000	0	3.47808-17	5.600000	0	3.61362-17	5.650000	0	0.00000+0126080803	2962

5.700000	0	1.28937-17	5.750000	0	0.000000	0	5.800000	0	0.000000	0	126080803	2464	
5.850000	0	1.32100-17	5.900000	0	7.76783-17	5.950000	0	0.000000	0	0.000000	0	126080803	2465
6.000000	0	2.70410-17	6.050000	0	0.000000	0	6.100000	0	1.63515-17	126080803	2466		
6.150000	0	0.000000	6.200000	0	1.98130-18	6.250000	0	0.000000	0	126080803	2467		
0.		5.0000E+04		0						126126080803	2468		
	126	1		0						126080803	2469		
0.000000	0	1.15111-13	5.000000	2	3.65318-13	1.000000	1	2.06835-12	126080803	2470			
1.500000	1	2.45341-12	2.000000	1	1.49089-11	2.500000	1	5.31112-12	126080803	2471			
3.000000	1	1.57657-12	3.500000	1	1.93889-12	4.000000	1	2.11481-12	126080803	2472			
4.500000	1	2.02422-12	5.000000	1	2.46134-11	5.500000	1	1.72111-11	126080803	2473			
6.000000	1	4.45314-12	6.500000	1	2.91727-11	7.000000	1	3.67924-11	126080803	2474			
7.500000	1	1.17990-11	8.000000	1	8.50514-12	8.500000	1	5.46351-12	126080803	2475			
9.000000	1	1.25921-11	9.500000	1	4.14341-12	1.000000	0	2.18399-11	126080803	2476			
1.050000	0	6.07408-13	1.100000	0	1.40778-11	1.150000	0	1.09877-12	126080803	2477			
1.200000	0	2.05887-12	1.250000	0	1.46012-11	1.300000	0	2.92636-13	126080803	2478			
1.350000	0	2.10478-11	1.400000	0	5.00523-12	1.450000	0	4.54952-12	126080803	2479			
1.500000	0	3.46895-12	1.550000	0	2.31467-12	1.600000	0	3.52000-13	126080803	2480			
1.650000	0	6.05029-12	1.700000	0	2.88803-12	1.750000	0	5.58935-12	126080803	2481			
1.800000	0	6.42753-12	1.850000	0	5.11461-13	1.900000	0	2.29131-12	126080803	2482			
1.950000	0	2.43018-14	2.000000	0	3.43028-12	2.050000	0	3.09732-12	126080803	2483			
2.100000	0	3.13668-13	2.150000	0	4.72105-12	2.200000	0	1.05934-12	126080803	2484			
2.250000	0	1.01415-13	2.300000	0	4.35594-14	2.350000	0	1.21214-11	126080803	2485			
2.400000	0	5.49231-14	2.450000	0	5.15835-14	2.500000	0	8.72289-13	126080803	2486			
2.550000	0	2.17889-13	2.600000	0	7.32039-15	2.650000	0	1.05498-12	126080803	2487			
2.700000	0	6.07938-14	2.750000	0	7.21647-14	2.800000	0	9.85740-14	126080803	2488			
2.850000	0	3.84758-15	2.900000	0	8.72774-17	2.950000	0	2.26231-13	126080803	2489			
3.000000	0	2.55757-13	3.050000	0	7.83019-15	3.100000	0	8.58541-16	126080803	2490			
3.150000	0	2.58416-14	3.200000	0	1.80288-13	3.250000	0	1.09506-14	126080803	2491			
3.300000	0	8.09468-14	3.350000	0	6.17308-15	3.400000	0	2.01846-14	126080803	2492			
3.450000	0	1.05734-13	3.500000	0	3.67074-15	3.550000	0	3.17338-16	126080803	2493			
3.600000	0	1.21074-13	3.650000	0	4.33279-17	3.700000	0	2.20771-14	126080803	2494			
3.750000	0	2.39910-17	3.800000	0	8.09167-17	3.850000	0	1.62849-14	126080803	2495			
3.900000	0	3.72885-16	3.950000	0	7.04140-15	4.000000	0	9.61073-15	126080803	2496			
4.050000	0	1.20893-16	4.100000	0	5.02863-16	4.150000	0	5.26849-18	126080803	2497			
4.200000	0	2.91217-17	4.250000	0	4.74165-17	4.300000	0	2.30537-17	126080803	2498			
4.350000	0	5.51021-16	4.400000	0	1.89512-17	4.450000	0	3.55972-17	126080803	2499			
4.500000	0	1.04577-17	4.550000	0	2.56777-19	4.600000	0	1.89977-17	126080803	3000			
4.650000	0	1.22513-18	4.700000	0	7.12183-14	4.750000	0	3.53532-17	126080803	3001			
4.800000	0	3.02402-17	4.850000	0	5.35437-15	4.900000	0	1.59734-17	126080803	3002			
4.950000	0	1.85641-17	5.000000	0	0.000000	5.050000	0	2.53677-17	126080803	3003			
5.100000	0	0.000000	5.150000	0	1.26798-16	5.200000	0	3.39558-17	126080803	3004			
5.250000	0	2.11289-17	5.300000	0	4.94467-17	5.350000	0	9.52024-18	126080803	3005			
5.400000	0	6.76641-18	5.450000	0	1.35235-17	5.500000	0	4.89892-18	126080803	3006			
5.550000	0	4.11752-17	5.600000	0	3.32268-17	5.650000	0	0.000000	0126080803	3007			
5.700000	0	1.18555-17	5.750000	0	0.000000	5.800000	0	0.000000	0126080803	3008			
5.850000	0	1.21465-17	5.900000	0	1.62551-17	5.950000	0	0.000000	0126080803	3009			
6.000000	0	2.48640-17	6.050000	0	0.000000	6.100000	0	1.50349-17	126080803	3010			
6.150000	0	0.000000	6.200000	0	7.75459-18	6.250000	0	0.000000	0126080803	3011			
0.		1.0000E+05		0						126126080803	3012		
	126	1		0						126080803	3013		
0.000000	0	4.44728-14	5.000000	2	3.48076-13	1.000000	1	1.96674-12	126080803	3014			
1.500000	1	4.31175-13	2.000000	1	8.78837-12	2.500000	1	3.32673-12	126080803	3015			
3.000000	1	7.52446-13	3.500000	1	1.39379-12	4.000000	1	5.65305-13	126080803	3016			
4.500000	1	1.19552-12	5.000000	1	1.42827-11	5.500000	1	6.11087-12	126080803	3017			
6.000000	1	2.27585-12	6.500000	1	2.37006-11	7.000000	1	1.94298-11	126080803	3018			
7.500000	1	4.10843-12	8.000000	1	2.28038-12	8.500000	1	2.44121-12	126080803	3019			
9.000000	1	2.52588-12	9.500000	1	1.99413-12	1.000000	0	7.57933-12	126080803	3020			
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1.80000+	0 1.25911-15	1.85000+	0 6.52478-16	1.90000+	0 2.94030-14	1260000003 3114
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2.85000+	0 3.06804-16	2.90000+	0 1.63215-18	2.95000+	0 3.20073-17	1260000003 3165

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3.450000*	0	3.67002-19	3.500000*	0	2.92451-18	3.550000*	0	4.60520-18	126080803	3169
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5.700000*	0	5.42430-19	5.750000*	0	0.000000*	5.800000*	0	0.000000*	0126080803	3184
5.850000*	0	5.55748-19	5.900000*	0	7.43129-19	5.950000*	0	0.000000*	0126080803	3185
6.000000*	0	1.13762-18	6.050000*	0	0.000000*	6.100000*	0	6.87878-19	126080803	3186
6.150000*	0	0.000000*	6.200000*	0	5.20342-20	6.250000*	0	0.000000*	0126080803	3187
0.	1.0000E+07	0	0	0	1	126126080803	3188			
126	1	0	0	0	0	0126080803	3189			
0.000000*	0	1.88730-15	5.000000-	2	2.41957-16	1.000000-	1	1.15304-14	126080803	3190
1.500000-	1	9.73419-17	2.000000-	1	1.92965-16	2.500000-	1	7.67123-17	126080803	3191
3.000000-	1	6.71529-16	3.500000-	1	6.39968-17	4.000000-	1	4.82214-18	126080803	3192
4.500000-	1	2.27002-14	5.000000-	1	1.52059-15	5.500000-	1	2.38409-18	126080803	3193
6.000000-	1	2.11007-15	6.500000-	1	4.58879-15	7.000000-	1	7.27123-14	126080803	3194
7.500000-	1	3.38458-13	8.000000-	1	1.70420-15	8.500000-	1	3.87356-15	126080803	3195
9.000000-	1	7.06344-16	9.500000-	1	2.45124-18	1.000000+	0	2.10127-18	126080803	3196
1.050000+	0	5.54323-17	1.100000+	0	4.01048-17	1.150000+	0	9.34718-18	126080803	3197
1.200000+	0	6.57585-16	1.250000+	0	4.63526-18	1.300000+	0	6.04502-19	126080803	3198
1.350000+	0	2.54451-18	1.400000+	0	3.79635-18	1.450000+	0	4.36277-18	126080803	3199
1.500000+	0	3.83412-19	1.550000+	0	1.39995-14	1.600000+	0	2.30702-19	126080803	3200
1.650000+	0	4.35221-19	1.700000+	0	2.05307-19	1.750000+	0	5.14074-18	126080803	3201
1.800000+	0	1.98379-19	1.850000+	0	1.15373-18	1.900000+	0	2.43286-18	126080803	3202
1.950000+	0	4.89297-18	2.000000+	0	2.82639-18	2.050000+	0	2.85123-18	126080803	3203
2.100000+	0	3.19637-18	2.150000+	0	1.62953-15	2.200000+	0	8.42801-20	126080803	3204
2.250000+	0	8.99557-19	2.300000+	0	7.63383-16	2.350000+	0	2.89003-18	126080803	3205
2.400000+	0	1.87041-18	2.450000+	0	3.93872-19	2.500000+	0	7.10347-16	126080803	3206
2.550000+	0	4.92001-19	2.600000+	0	7.21393-20	2.650000+	0	3.48615-20	126080803	3207
2.700000+	0	8.33940-19	2.750000+	0	1.23925-19	2.800000+	0	1.51331-19	126080803	3208
2.850000+	0	1.58808-17	2.900000+	0	3.25027-19	2.950000+	0	1.39079-20	126080803	3209
3.000000+	0	2.08317-20	3.050000+	0	2.98026-20	3.100000+	0	5.72076-18	126080803	3210
3.150000+	0	4.38903-20	3.200000+	0	1.23358-20	3.250000+	0	1.11072-20	126080803	3211
3.300000+	0	3.20943-20	3.350000+	0	4.58813-20	3.400000+	0	3.23605-20	126080803	3212
3.450000+	0	1.13480-20	3.500000+	0	4.00866-20	3.550000+	0	1.54306-19	126080803	3213
3.600000+	0	4.46371-20	3.650000+	0	2.10437-20	3.700000+	0	2.35104-20	126080803	3214
3.750000+	0	1.59781-20	3.800000+	0	3.65003-20	3.850000+	0	2.12844-21	126080803	3215
3.900000+	0	8.58811-21	3.950000+	0	4.62026-21	4.000000+	0	1.43608-21	126080803	3216
4.050000+	0	7.01373-20	4.100000+	0	8.29097-20	4.150000+	0	8.37218-22	126080803	3217
4.200000+	0	1.12402-20	4.250000+	0	3.79014-20	4.300000+	0	1.79206-21	126080803	3218
4.350000+	0	3.27879-20	4.400000+	0	3.64425-20	4.450000+	0	8.77276-21	126080803	3219
4.500000+	0	1.95730-20	4.550000+	0	2.53415-22	4.600000+	0	7.35547-20	126080803	3220
4.650000+	0	1.35516-22	4.700000+	0	1.40142-21	4.750000+	0	3.53878-22	126080803	3221
4.800000+	0	6.20624-20	4.850000+	0	1.04186-22	4.900000+	0	3.33125-20	126080803	3222
4.950000+	0	1.43044-21	5.000000+	0	0.000000*	5.050000+	0	2.78501-20	126080803	3223
5.100000+	0	0.000000*	5.150000+	0	8.49099-20	5.200000+	0	7.08209-20	126080803	3224
5.250000+	0	1.23346-21	5.300000+	0	2.93000-20	5.350000+	0	1.98521-20	126080803	3225
5.400000+	0	8.55665-21	5.450000+	0	2.82000-20	5.500000+	0	6.19474-21	126080803	3226
5.550000+	0	8.50607-20	5.600000+	0	6.92062-20	5.650000+	0	0.000000*	0126080803	3227
5.700000+	0	2.47217-20	5.750000+	0	0.000000*	5.800000+	0	0.000000*	0126080803	3228
5.850000+	0	2.53287-20	5.900000+	0	3.38961-20	5.950000+	0	0.000000*	0126080803	3229
6.000000+	0	5.18479-20	6.050000+	0	0.000000*	6.100000+	0	3.13515-20	126080803	3230
6.150000+	0	0.000000*	6.200000+	0	2.21884-21	6.250000+	0	0.000000*	0126080803	3231

0.	5.0000E+07	0	0	1	126126080803	3232
126	1	0	0	0	0126080803	3233
0.00000+0	1.02244-17	5.00000-	2	7.15870-17	1.00000-	1
1.50000+0	8.16357-18	2.00000-	1	2.29241-18	2.50000-	1
3.00000+0	9.86132-19	3.50000-	1	3.92224-18	4.00000-	1
4.50000+0	4.02784-17	5.00000-	1	2.12065-16	5.50000-	1
6.00000+0	2.75725-16	6.50000-	1	3.26778-16	7.00000-	1
7.50000+0	3.76783-15	8.00000-	1	8.27137-19	8.50000-	1
9.00000+0	3.21520-20	9.50000-	1	8.00024-22	1.00000+	0
1.05000+0	4.83682-19	1.10000+	0	9.79362-18	1.15000+	0
1.20000+0	2.79138-18	1.25000+	0	2.08037-19	1.30000+	0
1.35000+0	3.69214-19	1.40000+	0	4.56289-21	1.45000+	0
1.50000+0	1.35607-21	1.55000+	0	5.69400-18	1.60000+	0
1.65000+0	7.10913-22	1.70000+	0	5.47434-22	1.75000+	0
1.80000+0	1.05164-21	1.85000+	0	3.24182-22	1.90000+	0
1.95000+0	9.78003-19	2.00000+	0	1.14113-21	2.05000+	0
2.10000+0	1.38525-18	2.15000+	0	5.62957-16	2.20000+	0
2.25000+0	1.95071-22	2.30000+	0	5.75646-19	2.35000+	0
2.40000+0	7.92047-19	2.45000+	0	2.51273-22	2.50000+	0
2.55000+0	1.06125-19	2.60000+	0	8.26172-22	2.65000+	0
2.70000+0	2.22284-19	2.75000+	0	3.49575-23	2.80000+	0
2.85000+0	6.46306-22	2.90000+	0	1.19535-19	2.95000+	0
3.00000+0	1.97748-22	3.05000+	0	1.38416-23	3.10000+	0
3.15000+0	4.02115-23	3.20000+	0	8.49077-23	3.25000+	0
3.30000+0	1.49631-22	3.35000+	0	8.25512-23	3.40000+	0
3.45000+0	4.43253-23	3.50000+	0	2.76590-23	3.55000+	0
3.60000+0	1.80787-22	3.65000+	0	2.28187-24	3.70000+	0
3.75000+0	4.70944-25	3.80000+	0	9.69758-25	3.85000+	0
3.90000+0	1.07684-22	3.95000+	0	5.71785-24	4.00000+	0
4.05000+0	9.87567-24	4.10000+	0	6.41552-24	4.15000+	0
4.20000+0	1.81741-27	4.25000+	0	1.40090-28	4.30000+	0
4.35000+0	1.94811-27	4.40000+	0	4.45676-30	4.45000+	0
4.50000+0	5.67748-30	4.55000+	0	0.00000+0	4.60000+	0
4.65000+0	0.00000+0	4.70000+	0	6.94339-24	4.75000+	0
4.80000+0	0.00000+0	4.85000+	0	5.25728-25	4.90000+	0
4.95000+0	6.94818-29	5.00000+	0	0.00000+0	5.05000+	0
5.10000+0	0.00000+0	5.15000+	0	3.15238-24	5.20000+	0
5.25000+0	7.49616-29	5.30000+	0	1.29634-28	5.35000+	0
5.40000+0	2.49061-29	5.45000+	0	0.00000+0	5.50000+	0
5.55000+0	0.00000+0	5.60000+	0	0.00000+0	5.65000+	0
5.70000+0	0.00000+0	5.75000+	0	0.00000+0	5.80000+	0
5.85000+0	0.00000+0	5.90000+	0	0.00000+0	5.95000+	0
6.00000+0	0.00000+0	6.05000+	0	0.00000+0	6.10000+	0
6.15000+0	0.00000+0	6.20000+	0	6.45759-30	6.25000+	0
0.	1.0000E+08	0	0	0	1	108126080803
108	1	0	0	0	0126080803	3276
0.00000+0	3.00495-18	5.00000-	2	1.80890-17	1.00000-	1
1.50000+0	5.66531-18	2.00000-	1	5.63499-19	2.50000-	1
3.00000+0	6.67376-19	3.50000-	1	2.64823-18	4.00000-	1
4.50000+0	2.21892-17	5.00000-	1	7.53031-17	5.50000-	1
6.00000+0	1.44944-16	6.50000-	1	2.48429-15	7.00000-	1
7.50000+0	1.27634-17	8.00000-	1	4.06842-19	8.50000-	1
9.00000+0	4.08350-21	9.50000-	1	5.96346-22	1.00000+	0
1.05000+0	1.67904-19	1.10000+	0	2.42061-18	1.15000+	0
1.20000+0	4.58863-21	1.25000+	0	7.28594-20	1.30000+	0
1.35000+0	2.27834-19	1.40000+	0	4.37882-21	1.45000+	0
1.50000+0	1.37440-21	1.55000+	0	1.80879-18	1.60000+	0
1.65000+0	5.53035-22	1.70000+	0	4.94993-22	1.75000+	0
1.80000+0	9.80380-22	1.85000+	0	2.79182-22	1.90000+	0
1.95000+0	3.41567-19	2.00000+	0	1.00481-21	2.05000+	0
2.10000+0	4.83937-19	2.15000+	0	1.42423-16	2.20000+	0
2.25000+0	1.65323-22	2.30000+	0	7.99002-19	2.35000+	0
2.40000+0	2.76646-19	2.45000+	0	5.59843-22	2.50000+	0
2.55000+0	3.74678-20	2.60000+	0	8.57947-22	2.65000+	0
2.70000+0	7.76723-20	2.75000+	0	3.50558-23	2.80000+	0
2.85000+0	2.25759-23	2.90000+	0	4.17493-20	2.95000+	0
3.00000+0	2.00710-22	3.05000+	0	1.42078-23	3.10000+	0
3.15000+0	4.11871-23	3.20000+	0	8.51802-23	3.25000+	0
3.30000+0	1.49631-22	3.35000+	0	8.25512-23	3.40000+	0
3.45000+0	4.43253-23	3.50000+	0	2.76590-23	3.55000+	0
3.60000+0	1.80787-22	3.65000+	0	2.28187-24	3.70000+	0
3.75000+0	4.70944-25	3.80000+	0	9.69758-25	3.85000+	0
3.90000+0	1.07684-22	3.95000+	0	5.71785-24	4.00000+	0
4.05000+0	9.87567-24	4.10000+	0	6.41552-24	4.15000+	0
4.20000+0	1.81741-27	4.25000+	0	1.40090-28	4.30000+	0
4.35000+0	1.94811-27	4.40000+	0	4.45676-30	4.45000+	0
4.50000+0	5.67748-30	4.55000+	0	0.00000+0	4.60000+	0
4.65000+0	0.00000+0	4.70000+	0	6.94339-24	4.75000+	0
4.80000+0	0.00000+0	4.85000+	0	5.25728-25	4.90000+	0
4.95000+0	6.94818-29	5.00000+	0	0.00000+0	5.05000+	0
5.10000+0	0.00000+0	5.15000+	0	3.15238-24	5.20000+	0
5.25000+0	7.49616-29	5.30000+	0	1.29634-28	5.35000+	0
5.40000+0	2.49061-29	5.45000+	0	0.00000+0	5.50000+	0
5.55000+0	0.00000+0	5.60000+	0	0.00000+0	5.65000+	0
5.70000+0	0.00000+0	5.75000+	0	0.00000+0	5.80000+	0
5.85000+0	0.00000+0	5.90000+	0	0.00000+0	5.95000+	0
6.00000+0	0.00000+0	6.05000+	0	0.00000+0	6.10000+	0
6.15000+0	0.00000+0	6.20000+	0	6.45759-30	6.25000+	0
0.	1.0000E+08	0	0	0	1	108126080803
108	1	0	0	0	0126080803	3277
0.00000+0	3.00495-18	5.00000-	2	1.80890-17	1.00000-	1
1.50000+0	5.66531-18	2.00000-	1	5.63499-19	2.50000-	1
3.00000+0	6.67376-19	3.50000-	1	2.64823-18	4.00000-	1
4.50000+0	2.21892-17	5.00000-	1	7.53031-17	5.50000-	1
6.00000+0	1.44944-16	6.50000-	1	2.48429-15	7.00000-	1
7.50000+0	1.27634-17	8.00000-	1	4.06842-19	8.50000-	1
9.00000+0	4.08350-21	9.50000-	1	5.96346-22	1.00000+	0
1.05000+0	1.67904-19	1.10000+	0	2.42061-18	1.15000+	0
1.20000+0	4.58863-21	1.25000+	0	7.28594-20	1.30000+	0
1.35000+0	2.27834-19	1.40000+	0	4.37882-21	1.45000+	0
1.50000+0	1.37440-21	1.55000+	0	1.80879-18	1.60000+	0
1.65000+0	5.53035-22	1.70000+	0	4.94993-22	1.75000+	0
1.80000+0	9.80380-22	1.85000+	0	2.79182-22	1.90000+	0
1.95000+0	3.41567-19	2.00000+	0	1.00481-21	2.05000+	0
2.10000+0	4.83937-19	2.15000+	0	1.42423-16	2.20000+	0
2.25000+0	1.65323-22	2.30000+	0	7.99002-19	2.35000+	0
2.40000+0	2.76646-19	2.45000+	0	5.59843-22	2.50000+	0
2.55000+0	3.74678-20	2.60000+	0	8.57947-22	2.65000+	0
2.70000+0	7.76723-20	2.75000+	0	3.50558-23	2.80000+	0
2.85000+0	2.25759-23	2.90000+	0	4.17493-20	2.95000+	0
3.00000+0	2.00710-22	3.05000+	0	1.42078-23	3.10000+	0
3.15000+0	4.11871-23	3.20000+	0	8.51802-23	3.25000+	0
3.30000+0	1.49631-22	3.35000+	0	8.25512-23	3.40000+	0
3.45000+0	4.43253-23	3.50000+	0	2.76590-23	3.55000+	0
3.60000+0	1.80787-22	3.65000+	0	2.28187-24	3.70000+	0
3.75000+0	4.70944-25	3.80000+	0	9.69758-25	3.85000+	0
3.90000+0	1.07684-22	3.95000+	0	5.71785-24	4.00000+	0
4.05000+0	9.87567-24	4.10000+	0	6.41552-24	4.15000+	0
4.20000+0	1.81741-27	4.25000+	0	1.40090-28	4.30000+	0
4.35000+0	1.94811-27	4.40000+	0	4.45676-30	4.45000+	0
4.50000+0	5.67748-30	4.55000+	0	0.00000+0	4.60000+	0
4.65000+0	0.00000+0	4.70000+	0	6.94339-24	4.75000+	0
4.80000+0	0.00000+0	4.85000+	0	5.25728-25	4.90000+	0
4.95000+0	6.94818-29	5.00000+	0	0.00000+0	5.05000+	0
5.10000+0	0.00000+0	5.15000+	0	3.15238-24	5.20000+	0
5.25000+0	7.49616-29	5.30000+	0	1.29634-28	5.35000+	0
5.40000+0	2.49061-29	5.45000+	0	0.00000+0	5.50000+	0
5.55000+0	0.00000+0	5.60000+	0	0.00000+0	5.65000+	0
5.70000+0	0.00000+0	5.75000+	0	0.00000+0	5.80000+	0
5.85000+0	0.00000+0	5.90000+	0	0.00000+0	5.95000+	0
6.00000+0	0.00000+0	6.05000+	0	0.00000+0	6.10000+	0
6.15000+0	0.00000+0	6.20000+	0	6.45759-30	6.25000+	0
0.	1.0000E+08	0	0	0	1	108126080803
108	1	0	0	0	0126080803	3278
0.00000+0	3.00495-18	5.00000-	2	1.80890-17	1.00000-	1
1.50000+0	5.66531-18	2.00000-	1	5.63499-19	2.50000-	1
3.00000+0	6.67376-19	3.50000-	1	2.64823-18	4.00000-	1
4.50000+0	2.21892-17	5.00000-	1	7.53031-17	5.50000-	1
6.00000+0	1.44944-16	6.50000-	1	2.48429-15	7.00000-	1
7.50000+0	1.27634-17	8.00000-	1	4.06842-19	8.50000-	1
9.00000+0	4.08350-21	9.50000-	1	5.96346-22	1.00000+	0
1.05000+0	1.67904-19	1.10000+	0	2.42061-18	1.15000+	0
1.20000+0	4.58863-21	1.25000+	0	7.28594-20	1.30000+	0
1.35000+0	2.27834-19	1.40000+	0	4.37882-21	1.45000+	0
1.50000+0	1.37440-21	1.55000+	0	1.80879-18	1.60000+	0
1.65000+0	5.53035-22	1.70000+	0	4.94993-22	1.75000+	0
1.80000+0	9.80380-22	1.85000+	0	2.79182-22	1.90000+	0
1.95000+0	3.41567-19	2.0000				

3.30000+	0	1.53704-22	3.35000+	0	8.56270-23	3.40000+	0	3.95047-23	126080803	3300
3.45000+	0	4.41931-23	3.50000+	0	2.86727-23	3.55000+	0	1.94114-23	126080803	3301
3.60000+	0	1.85171-22	3.65000+	0	2.36583-24	3.70000+	0	3.49100-23	126080803	3302
3.75000+	0	4.89113-25	3.80000+	0	9.03219-25	3.85000+	0	2.43635-23	126080803	3303
3.90000+	0	1.11940-22	3.95000+	0	5.80722-24	4.00000+	0	5.62837-24	126080803	3304
4.05000+	0	1.02562-23	4.10000+	0	6.64004-26	4.15000+	0	5.19272-30	126080803	3305
4.20000+	0	1.88024-27	4.25000+	0	5.62757-29	4.30000+	0	6.08853-29	126080803	3306
4.35000+	0	1.85210-27	4.40000+	0	0.00000+	4.45000+	0	8.24716-29	126080803	3307
4.50000+	0	0.00000+	4.55000+	0	0.00000+	4.60000+	0	1.46721-23	126080803	3308
4.65000+	0	0.00000+	4.70000+	0	6.10917-24	4.75000+	0	0.00000+	0126080803	3309
4.80000+	0	0.00000+	4.85000+	0	4.59445-25	4.90000+	0	0.00000+	0126080803	3310
4.95000+	0	6.13850-29	5.00000+	0	0.00000+	5.05000+	0	4.17007-29	126080803	3311
5.10000+	0	0.00000+	5.15000+	0	2.98705-26	5.20000+	0	0.00000+	0126080803	3312
5.25000+	0	7.13358-29	5.30000+	0	1.22825-20	5.35000+	0	0.00000+	0126080803	3313
0.		5.00000E+08	0	0	0	1		108126080803	3314	
108	1	0	0	0	0	0		0126080803	3315	
0.00000+	0	3.70018-20	5.00000-	2	3.30748-22	1.00000-	1	3.55046-20	126080803	3316
1.50000-	1	2.24523-19	2.00000-	1	2.24361-20	2.50000-	1	4.66824-22	126080803	3317
3.00000-	1	2.70624-20	3.50000-	1	7.04863-19	4.00000-	1	2.34002-18	126080803	3318
4.50000-	1	8.78449-19	5.00000-	1	8.83059-19	5.50000-	1	9.88340-21	126080803	3319
6.00000-	1	3.83790-18	6.50000-	1	2.12483-15	7.00000-	1	3.72531-21	126080803	3320
7.50000-	1	5.75267-20	8.00000-	1	9.72162-21	8.50000-	1	4.30045-21	126080803	3321
9.00000-	1	3.12970-21	9.50000-	1	5.87523-22	1.00000+	0	5.17097-21	126080803	3322
1.05000+	0	8.10460-22	1.10000+	0	1.81350-21	1.15000+	0	1.94305-21	126080803	3323
1.20000+	0	6.55577-22	1.25000+	0	6.30347-22	1.30000+	0	3.23236-22	126080803	3324
1.35000+	0	5.86661-21	1.40000+	0	4.31849-21	1.45000+	0	1.68029-21	126080803	3325
1.50000+	0	1.35705-21	1.55000+	0	5.54952-21	1.60000+	0	4.33705-22	126080803	3326
1.65000+	0	3.45889-22	1.70000+	0	4.88740-22	1.75000+	0	6.83547-22	126080803	3327
1.80000+	0	7.67992-22	1.85000+	0	2.74435-22	1.90000+	0	5.63917-22	126080803	3328
1.95000+	0	1.10295-22	2.00000+	0	9.89160-22	2.05000+	0	3.06426-22	126080803	3329
2.10000+	0	2.70402-22	2.15000+	0	2.82059-21	2.20000+	0	1.50938-21	126080803	3330
2.25000+	0	1.82250-22	2.30000+	0	1.55250-22	2.35000+	0	2.16285-21	126080803	3331
2.40000+	0	8.21880-23	2.45000+	0	2.56566-22	2.50000+	0	1.05522-21	126080803	3332
2.55000+	0	8.02668-22	2.60000+	0	8.47125-22	2.65000+	0	2.80075-22	126080803	3333
2.70000+	0	7.01714-23	2.75000+	0	3.46135-23	2.80000+	0	1.73454-22	126080803	3334
2.85000+	0	5.94552-24	2.90000+	0	9.75229-24	2.95000+	0	3.35574-22	126080803	3335
3.00000+	0	1.98177-22	3.05000+	0	1.40286-23	3.10000+	0	1.71907-23	126080803	3336
3.15000+	0	4.06675-23	3.20000+	0	8.41054-23	3.25000+	0	1.55794-23	126080803	3337
3.30000+	0	1.51763-22	3.35000+	0	8.45469-23	3.40000+	0	3.90054-23	126080803	3338
3.45000+	0	4.36255-23	3.50000+	0	2.83111-23	3.55000+	0	1.91605-23	126080803	3339
3.60000+	0	1.82835-22	3.65000+	0	2.33994-24	3.70000+	0	3.44755-23	126080803	3340
3.75000+	0	4.82944-25	3.80000+	0	8.91826-25	3.85000+	0	2.40561-23	126080803	3341
3.90000+	0	1.10430-22	3.95000+	0	5.73396-24	4.00000+	0	5.55736-24	126080803	3342
4.05000+	0	1.50126-23	4.10000+	0	6.55628-26	4.15000+	0	5.12637-30	126080803	3343
4.20000+	0	1.85682-27	4.25000+	0	5.55381-29	4.30000+	0	6.01142-29	126080803	3344
4.35000+	0	1.82872-27	4.40000+	0	0.00000+	4.45000+	0	8.14227-29	126080803	3345
4.50000+	0	0.00000+	4.55000+	0	0.00000+	4.60000+	0	1.44867-23	126080803	3346
4.65000+	0	0.00000+	4.70000+	0	6.03197-24	4.75000+	0	0.00000+	0126080803	3347
4.80000+	0	0.00000+	4.85000+	0	4.53039-25	4.90000+	0	0.00000+	0126080803	3348
4.95000+	0	0.00000+	5.00000+	0	0.00000+	5.05000+	0	4.11779-29	126080803	3349
5.10000+	0	0.00000+	5.15000+	0	5.94705-26	5.20000+	0	0.00000+	0126080803	3350
5.25000+	0	7.04331-29	5.30000+	0	1.21271-28	5.35000+	0	0.00000+	0126080803	3351
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0.00000+	0	8.42318-22	5.00000-	2	1.06075-22	1.00000-	1	1.29144-21	126080803	3354
1.50000-	1	4.63098-21	2.00000-	1	7.62207-22	2.50000-	1	4.66561-22	126080803	3355
3.00000-	1	1.83578-21	3.50000-	1	2.18811-21	4.00000-	1	4.29797-20	126080803	3356
4.50000-	1	1.47999-20	5.00000-	1	3.13735-19	5.50000-	1	1.04223-21	126080803	3357
6.00000-	1	6.99758-20	6.50000-	1	1.74727-15	7.00000-	1	3.72480-21	126080803	3358
7.50000-	1	9.04160-21	8.00000-	1	4.78436-21	8.50000-	1	3.88107-21	126080803	3359
9.00000-	1	3.29655-21	9.50000-	1	5.87443-22	1.00000+	0	2.40436-21	126080803	3360
1.05000+	0	7.82766-22	1.10000+	0	1.24068-21	1.15000+	0	3.21634-22	126080803	3361
1.20000+	0	6.55488-22	1.25000+	0	6.24535-22	1.30000+	0	3.23192-22	126080803	3362
1.35000+	0	2.78589-21	1.40000+	0	4.31791-21	1.45000+	0	5.55003-22	126080803	3363
1.50000+	0	1.35687-21	1.55000+	0	5.25342-21	1.60000+	0	4.29910-22	126080803	3364
1.65000+	0	5.45815-22	1.70000+	0	4.88674-22	1.75000+	0	5.61245-22	126080803	3365
1.80000+	0	7.87861-22	1.85000+	0	2.74398-22	1.90000+	0	5.36513-22	126080803	3366
1.95000+	0	5.98926-23	2.00000+	0	9.89426-22	2.05000+	0	3.06304-22	126080803	3367

2.10000+	0	2.10494-22	2.15000+	0	1.03523-21	2.20000+	0	1.50917-21126080803	3368
2.25000+	0	1.52228-22	2.30000+	0	1.22430-22	2.35000+	0	2.04526-21126080803	3369
2.40000+	0	3.05051-23	2.45000+	0	2.50531-22	2.50000+	0	1.004905-21126080803	3370
2.55000+	0	5.95591-22	2.60000+	0	8.47010-22	2.65000+	0	2.80037-22126080803	3371
2.70000+	0	5.73468-23	2.75000+	0	3.46084-23	2.80000+	0	1.73430-22126080803	3372
2.85000+	0	5.94470-24	2.90000+	0	2.85008-24	2.95000+	0	3.35548-22126080803	3373
3.00000+	0	1.98151-22	3.05000+	0	1.40267-23	3.10000+	0	1.71943-23126080803	3374
3.15000+	0	4.00620-23	3.20000+	0	8.40440-23	3.25000+	0	1.55773-23126080803	3375
3.30000+	0	1.51744-22	3.35000+	0	8.45354-23	3.40000+	0	3.90011-23126080803	3376
3.45000+	0	4.30106-23	3.50000+	0	2.83072-23	3.55000+	0	1.91637-23126080803	3377
3.60000+	0	1.02311-22	3.65000+	0	2.33762-24	3.70000+	0	3.44708-23126080803	3378
3.75000+	0	4.82878-25	3.80000+	0	8.91706-25	3.85000+	0	2.40529-23126080803	3379
3.90000+	0	1.10415-22	3.95000+	0	5.73318-24	4.00000+	0	5.55601-24126080803	3380
4.05000+	0	1.01255-23	4.10000+	0	6.55339-26	4.15000+	0	5.12541-30126080803	3381
4.20000+	0	1.05626-27	4.25000+	0	5.55289-29	4.30000+	0	6.01048-29126080803	3382
4.35000+	0	1.02844-27	4.40000+	0	0.00000+ 0	4.45000+	0	8.14079-29126080803	3383
4.50000+	0	0.00000+ 0	4.55000+	0	0.00000+ 0	4.60000+	0	1.44847-25126080803	3384
4.65000+	0	0.00000+ 0	4.70000+	0	6.03115-24	4.75000+	0	0.00000+ 0126080803	3385
4.80000+	0	0.00000+ 0	4.85000+	0	4.53578-25	4.90000+	0	0.00000+ 0126080803	3386
4.95000+	0	0.05927-29	5.00000+	0	0.00000+ 0	5.05000+	0	4.11717-29126080803	3387
5.10000+	0	0.00000+ 0	5.15000+	0	2.94880-28	5.20000+	0	0.00000+ 0126080803	3388
5.25000+	0	1.04224-29	5.30000+	0	7.21252-28	5.35000+	0	0.00000+ 0126080803	3389
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	108	1		0	0		0	0126080803	3391
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1.50000+	1	6.18947-22	2.00000-	1	3.66452-22	2.50000-	1	4.66094-22126080803	3393
3.00000+	1	1.36327-21	3.50000-	1	3.14734-22	4.00000-	1	1.07459-21126080803	3394
4.50000+	1	4.13727-21	5.00000-	1	1.40064-21	5.50000-	1	9.98222-22126080803	3395
6.00000+	1	1.91758-21	6.50000-	1	7.97624-17	7.00000-	1	3.72107-21126080803	3396
7.50000+	1	9.39925-21	8.00000-	1	4.75559-21	8.50000-	1	3.88373-21126080803	3397
9.00000+	1	3.29325-21	9.50000-	1	5.80555-22	1.00000+	0	2.39794-21126080803	3398
1.05000+	0	7.01982-22	1.10000+	0	1.24736-21	1.15000+	0	3.13927-22126080803	3399
1.20000+	0	6.54832-22	1.25000+	0	6.23909-22	1.30000+	0	3.22869-22126080803	3400
1.35000+	0	2.76813-21	1.40000+	0	4.31359-21	1.45000+	0	5.54408-22126080803	3401
1.50000+	0	1.35551-21	1.55000+	0	5.24013-21	1.60000+	0	4.29479-22126080803	3402
1.65000+	0	5.45269-22	1.70000+	0	4.88185-21	1.75000+	0	5.60215-22126080803	3403
1.80000+	0	9.06893-22	1.85000+	0	2.74123-22	1.90000+	0	5.35973-22126080803	3404
1.95000+	0	5.95265-23	2.00000+	0	7.88036-22	2.05000+	0	3.06077-22126080803	3405
2.10000+	0	2.10274-22	2.15000+	0	1.03707-21	2.20000+	0	1.50706-21126080803	3406
2.25000+	0	1.02046-22	2.30000+	0	1.22304-22	2.35000+	0	2.09316-21126080803	3407
2.40000+	0	3.04635-23	2.45000+	0	5.56274-22	2.50000+	0	1.04801-21126080803	3408
2.55000+	0	5.95903-22	2.60000+	0	8.46162-22	2.65000+	0	2.79737-22126080803	3409
2.70000+	0	5.72880-23	2.75000+	0	3.45741-23	2.80000+	0	1.73256-22126080803	3410
2.85000+	0	5.93876-24	2.90000+	0	2.85447-24	2.95000+	0	3.35212-22126080803	3411
3.00000+	0	1.97952-22	3.05000+	0	1.40127-23	3.10000+	0	1.71771-22126080803	3412
3.15000+	0	4.00213-23	3.20000+	0	8.40098-23	3.25000+	0	1.55617-23126080803	3413
3.30000+	0	1.51593-22	3.35000+	0	8.44508-23	3.40000+	0	3.89020-23126080803	3414
3.45000+	0	4.33760-23	3.50000+	0	2.82789-23	3.55000+	0	1.91448-23126080803	3415
3.60000+	0	1.02628-22	3.65000+	0	2.93728-24	3.70000+	0	3.44303-23126080803	3416
3.75000+	0	4.82395-25	3.80000+	0	8.90813-25	3.85000+	0	2.40288-23126080803	3417
3.90000+	0	1.10304-22	3.95000+	0	5.72744-24	4.00000+	0	5.55104-24126080803	3418
4.05000+	0	1.01154-23	4.10000+	0	6.54881-24	4.15000+	0	5.11877-30126080803	3419
4.20000+	0	1.85440-27	4.25000+	0	5.54645-29	4.30000+	0	6.00378-29126080803	3420
4.35000+	0	1.82645-27	4.40000+	0	1.08587-30	4.45000+	0	8.13188-29126080803	3421
4.50000+	0	0.00000+ 0	4.55000+	0	0.00000+ 0	4.60000+	0	1.44702-25126080803	3422
4.65000+	0	1.14417-30	4.70000+	0	6.02311-24	4.75000+	0	0.00000+ 0126080803	3423
4.80000+	0	0.00000+ 0	4.85000+	0	4.53124-25	4.90000+	0	0.00000+ 0126080803	3424
4.95000+	0	0.05325-29	5.00000+	0	0.00000+ 0	5.05000+	0	4.11258-29126080803	3425
5.10000+	0	0.00000+ 0	5.15000+	0	2.94558-28	5.20000+	0	0.00000+ 0126080803	3426
5.25000+	0	1.03455-29	5.30000+	0	1.21120-28	5.35000+	0	0.00000+ 0126080803	3427
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	108	1		0	0		0	0126080803	3429
0.00000+	0	1.71458-22	5.00000-	2	1.05506-22	1.00000-	1	7.59672-22126080803	3430
1.50000+	1	6.10922-22	2.00000-	1	3.65253-22	2.50000-	1	4.64559-22126080803	3431
3.00000+	1	1.35881-21	3.50000-	1	3.13704-22	4.00000-	1	1.07107-21126080803	3432
4.50000+	1	4.12433-21	5.00000-	1	1.30751-21	5.50000-	1	9.94957-22126080803	3433
6.00000+	1	1.91128-21	6.50000-	1	2.00019-21	7.00000-	1	3.70890-21126080803	3434
7.50000+	1	9.36852-21	8.00000-	1	4.74003-18	8.50000-	1	3.87103-21126080803	3435
9.00000+	1	3.28240-21	9.50000-	1	5.84435-22	1.00000+	0	2.39009-21126080803	3436

1.05000*	0	1.19423-22	1.10000*	0	1.24328-21	1.15000*	0	3.12900-22126080803	3437
1.20000*	0	0.52690-22	1.25000*	0	6.21868-22	1.30000*	0	3.21812-22126080803	3438
1.35000*	0	2.15903-21	1.40000*	0	4.29948-21	1.45000*	0	5.52634-22126080803	3439
1.50000*	0	1.35108-21	1.55000*	0	5.23097-21	1.60000*	0	4.28014-22126080803	3440
1.65000*	0	5.43495-22	1.70000*	0	4.86584-22	1.75000*	0	5.58352-22126080803	3441
1.80000*	0	4.03729-22	1.85000*	0	2.73226-22	1.90000*	0	5.34220-22126080803	3442
1.95000*	0	5.46308-23	2.00000*	0	9.84803-22	2.05000*	0	3.05016-22126080803	3443
2.10000*	0	2.09586-22	2.15000*	0	1.03367-21	2.20000*	0	1.50213-21126080803	3444
2.25000*	0	1.01536-22	2.30000*	0	1.21704-22	2.35000*	0	2.08631-21126080803	3445
2.40000*	0	3.63442-23	2.45000*	0	5.55436-22	2.50000*	0	1.04458-21126080803	3446
2.55000*	0	5.43954-22	2.60000*	0	8.43394-22	2.65000*	0	2.788+2-22126080803	3447
2.70000*	0	5.11005-23	2.75000*	0	3.44010-23	2.80000*	0	1.72670-22126080803	3448
2.85000*	0	5.91933-24	2.90000*	0	2.84313-24	2.95000*	0	3.34116-22126080803	3449
3.00000*	0	1.47130-22	3.05000*	0	1.38568-22	3.10000*	0	1.71209-22126080803	3450
3.15000*	0	4.04884-23	3.20000*	0	8.37350-23	3.25000*	0	1.55108-22126080803	3451
3.30000*	0	1.51097-22	3.35000*	0	8.41746-23	3.40000*	0	3.883+6-22126080803	3452
3.45000*	0	4.30234-23	3.50000*	0	2.81854-23	3.55000*	0	1.90821-22126080803	3453
3.60000*	0	1.82030-22	3.65000*	0	2.32464-24	3.70000*	0	3.43237-22126080803	3454
3.75000*	0	4.80817-25	3.80000*	0	8.87894-25	3.85000*	0	2.39502-22126080803	3455
3.90000*	0	1.09443-22	3.95000*	0	5.70871-24	4.00000*	0	5.53208-22126080803	3456
4.05000*	0	1.00823-23	4.10000*	0	6.52138-26	4.15000*	0	5.10114-30126080803	3457
4.20000*	0	1.84433-27	4.25000*	0	5.52778-29	4.30000*	0	5.98313-29126080803	3458
4.35000*	0	1.82038-27	4.40000*	0	1.08205-30	4.45000*	0	8.10410-29126080803	3459
4.50000*	0	0.00000* 0	4.55000*	0	0.00000* 0	4.60000*	0	1.44229-22126080803	3460
4.65000*	0	1.14024-30	4.70000*	0	6.00540-24	4.75000*	0	0.00000* 0126080803	3461
4.80000*	0	0.00000* 0	4.85000*	0	4.51642-25	4.90000*	0	0.00000* 0126080803	3462
4.95000*	0	0.03312-29	5.00000*	0	0.00000* 0	5.05000*	0	4.09900-29126080803	3463
5.10000*	0	0.00000* 0	5.15000*	0	2.43379-28	5.20000*	0	0.00000* 0126080803	3464
5.25000*	0	1.01117-29	5.30000*	0	1.20117-28	5.35000*	0	0.00000* 0126080803	3465
9.2233E+04	2.3104E+02		0		0			126080 0	3466
0.	0.		0		0			0126080811	3467
0.	24	0	0		0		1	24126080811	3468
0.	0.		0		0		1	0126080811	3469
151	1		0		0		0	151126080811	3470
0.00000*	0	1.00299-10	5.00000*	2	5.63164-0	1.00000*	1	0126080811	3471
1.50000*	1	2.90390-8	2.00000*	1	4.47894-8	2.50000*	1	1.54489-7126080811	3472
3.00000*	1	2.53019-8	3.50000*	1	9.79193-8	4.00000*	1	9.37117-8126080811	3473
4.50000*	1	2.04534-7	5.00000*	1	4.60281-7	5.50000*	1	6.08493-8126080811	3474
6.00000*	1	1.18930-7	6.50000*	1	4.52109-8	7.00000*	1	2.54705-7126080811	3475
7.50000*	1	6.22794-8	8.00000*	1	6.17234-7	8.50000*	1	8.14401-8126080811	3476
9.00000*	1	7.04703-8	9.50000*	1	1.07766-7	1.00000*	0	6.00042-8126080811	3477
1.05000*	0	8.35756-8	1.10000*	0	2.48081-7	1.15000*	0	6.68438-8126080811	3478
1.20000*	0	2.16029-7	1.25000*	0	1.41403-7	1.30000*	0	5.92304-8126080811	3479
1.35000*	0	9.06149-8	1.40000*	0	5.27425-7	1.45000*	0	2.03938-7126080811	3480
1.50000*	0	1.38416-7	1.55000*	0	1.13931-7	1.60000*	0	1.15817-7126080811	3481
1.65000*	0	4.10863-8	1.70000*	0	8.88767-8	1.75000*	0	8.60832-8126080811	3482
1.80000*	0	8.38150-8	1.85000*	0	9.83344-8	1.90000*	0	1.22325-7126080811	3483
1.95000*	0	1.08590-7	2.00000*	0	9.76862-8	2.05000*	0	8.64905-8126080811	3484
2.10000*	0	1.00119-7	2.15000*	0	8.58365-8	2.20000*	0	8.78866-8126080811	3485
2.25000*	0	1.00261-7	2.30000*	0	1.00040-7	2.35000*	0	9.20677-8126080811	3486
2.40000*	0	1.00689-7	2.45000*	0	1.48026-7	2.50000*	0	8.82407-8126080811	3487
2.55000*	0	1.31086-7	2.60000*	0	1.00624-7	2.65000*	0	9.67732-8126080811	3488
2.70000*	0	1.40098-7	2.75000*	0	7.03569-7	2.80000*	0	8.32734-8126080811	3489
2.85000*	0	1.04369-7	2.90000*	0	8.76790-8	2.95000*	0	9.29322-8126080811	3490
3.00000*	0	1.31835-8	3.05000*	0	7.49667-8	3.10000*	0	7.48100-8126080811	3491
3.15000*	0	7.22954-8	3.20000*	0	6.72858-8	3.25000*	0	7.79240-8126080811	3492
3.30000*	0	6.61075-8	3.35000*	0	6.96886-8	3.40000*	0	6.50322-8126080811	3493
3.45000*	0	5.85221-8	3.50000*	0	6.19124-8	3.55000*	0	6.61038-8126080811	3494
3.60000*	0	6.17979-8	3.65000*	0	5.22058-8	3.70000*	0	9.12745-8126080811	3495
3.75000*	0	5.02350-8	3.80000*	0	5.23303-8	3.85000*	0	5.33259-8126080811	3496
3.90000*	0	4.33002-8	3.95000*	0	4.09090-8	4.00000*	0	4.32073-8126080811	3497
4.05000*	0	5.44031-8	4.10000*	0	5.90834-8	4.15000*	0	3.85118-8126080811	3498
4.20000*	0	3.35721-8	4.25000*	0	4.07452-8	4.30000*	0	3.39930-8126080811	3499
4.35000*	0	3.48113-8	4.40000*	0	3.12227-8	4.45000*	0	3.03021-8126080811	3500
4.50000*	0	2.76980-8	4.55000*	0	2.46469-8	4.60000*	0	2.87276-8126080811	3501
4.65000*	0	2.28005-8	4.70000*	0	2.19051-8	4.75000*	0	3.15177-8126080811	3502
4.80000*	0	2.01901-8	4.85000*	0	1.93872-8	4.90000*	0	2.11146-8126080811	3503
								2.17203-8126080811	3504

4.95000+ 0 1.80483- 8 5.00000+ 0 1.89463- 8 5.05000+ 0 1.89408- 8126080811 3205
 5.10000+ 0 1.53466- 8 5.15000+ 0 2.30097- 8 5.20000+ 0 2.05037- 8126080811 3206
 5.25000+ 0 1.32812- 8 5.30000+ 0 1.52754- 8 5.35000+ 0 1.35138- 8126080811 3207

REMAINDER OF CARDS IN FILE DELETED

APPENDIX B

LASL Identification
 No. LP-0847

PROGRAM FITPULS (TAPE5,TAPE6,TAPE7,TAPE10,TAPE20)	FIT	21
C	FIT	31
C THIS PROGRAM ACCEPTS FISSION-PRODUCT DATA (HETA AND GAMMA) IN	FIT	41
C UNITS OF ENERGY/FISSION WHICH HAS BEEN ENERGY BINNED INTO FINE	FIT	51
C GROUPS(150) FOR A NUMBER OF COOLING TIME STEPS DERIVED AS FOLLOWS-	FIT	61
C YIELD DATA FROM ENDF WAS FIRST PROCESSED BY THE FPSYS CODE TO	FIT	71
C SUPPLY FINE GROUP INPUT FOR THE FPSPEC CODE. FPSPEC ALSO	FIT	81
C REQUIRES OUTPUT FROM THE CINDER-10 CODE. FINALLY THE OUTPUT OF	FIT	91
C FPSPEC WAS PROCESSED BY THE FOTOELF CODE WHICH PUTS THE DATA IN	FIT	101
C AN ENDF-LIKE FORMAT WHICH IS THE INPUT DATA LIBRARY FOR THIS	FIT	111
C CODE(FITPULS).	FIT	121
C	FIT	131
C FITPULS REBINS THIS DATA INTO A USER CHOSEN BROAD GROUP STRUCTURE	FIT	141
C (NOTE THAT THIS REBINNING CHANGES UNITS TO ENERGY/FISSION-SEC.)	FIT	151
C AND FITS THE DATA FOR EACH GROUP WITH A LINEAR COMBINATION OF	FIT	161
C FUNCTIONS AS FOLLOWS --	FIT	171
C	FIT	181
C $GXC(I,K) = \text{SUM} \cdot \text{ALF}(L,K) \cdot (\text{EXP}(-\text{ALAM}(L,K) \cdot T(I)))$, SUM OVER $L=1, KTRM$,	FIT	191
C WHERE KTRM IS THE NUMBER OF PAIRS OF PARAMETERS (ALF,	FIT	201
C ALAM) FOR GROUP K.	FIT	211
C	FIT	221
C $GXC(I,K) = \text{ENERGY}(\text{MEV})/\text{FISS-SEC}$ FOR GROUP K AND COOLING TIME $T(I)$.	FIT	231
C MAX. ALLOWED VALUE FOR $KTRM(KTR(K))$, NO. OF PARAM. PAIRS/GP=50.	FIT	241
C MAX. ALLOWED NO. OF BROAD GROUPS, NERG=25.	FIT	251
C MAX. ALLOWED NO. OF INPUT COOLING TIME STEPS, ITSP=70.	FIT	261
C	FIT	271
C THIS CODE IS USUALLY RUN IN SEVERAL PASSES. THE REASON FOR THIS	FIT	281
C IS THAT ON THE INITIAL PASSES, SINGLE PARAMETER (ALF) FITS ARE	FIT	291
C MADE FOR THE SPECTRA AND ON FINAL PASSES, FITS ARE MADE MORE	FIT	301
C ACCURATE BY FITTING BOTH PARAMETERS. AN EXCEPTION IS THE CASE	FIT	311
C WHERE GOOD FITS HAVE PREVIOUSLY BEEN OBTAINED FOR A PARTICULAR	FIT	321
C GROUP STRUCTURE FOR ONE NUCLIDE AND FITS ARE DESIRED FOR ANOTHER	FIT	331
C NUCLIDE IN THE SAME GROUP STRUCTURE. THEN, THE FIRST SET OF	FIT	341
C PARAMETERS CAN BE APPLIED DIRECTLY TO THE SECOND PROBLEM.	FIT	351
C	FIT	361
C THE CODE ALSO HAS AN OPTION OF REDUCING EXPERIMENTAL DATA FROM	FIT	371
C A FINITE IRRADIATION TIME TO A PULSE AND OBTAINING A FIT FOR THE	FIT	381
C EQUIVALENT PULSE. FOR THIS OPTION SET IRAD=1.	FIT	391
C	FIT	401
C COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPRUB,	FIT	411
C 1 NIN, NOUI	FIT	421
C COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(25,50)	FIT	431
C 1 5,50)	FIT	441
C COMMON /PULSCAL/ A(50,50), B(50,1)	FIT	451
C COMMON /PULSOUT/ ALPHA(50), FXC(100), PCT(100)	FIT	461
C COMMON /MANI/ WX(100), IITL(8), KTR(50), ND(10), KKN(25), DIFLIM	FIT	471
C DIMENSION TC(100), LXX(20), TMN(20), TMA(20)	FIT	481
C COMMON /ENDF/ MAT, MF, MT, RUNTIM, NPUN	FIT	491
C COMMON /TRMOT/ TL(10), LTM(50), LT	FIT	501
C COMMON /FINRAD/ IRAD, NLOKS, RADT(200), DELT(200)	FIT	511

C		FIT	521
	NIN=3	FIT	531
	NOUT=6	FIT	541
	NDT=10	FIT	551
	READ (NIN,170) NPUN,IRAD,NCORS	FIT	561
C		FIT	571
C	SET NPUN=7 HERE IF REBINNED DATA CARDS WANTED, OTHERWISE NPUN=20.	FIT	581
C	IRAD=0, REGULAR PULSE FIT REQUESTED, =1, FIT FOR FINITE IRRADIATION	FIT	591
C	TIME DATA WANTED.	FIT	601
C	NCOR=0, CALL CORSBIN, =1, NO CALL.	FIT	611
C		FIT	621
	IF (INCORS.LE.0) CALL CUNSBIN	FIT	631
C		FIT	641
C	SEE CUNSBIN FOR MAT1,MF1,MT1 INPUT.	FIT	651
C		FIT	661
	READ (NIN,150) (TITL(I),I=1,8)	FIT	671
C		FIT	681
C	TITL=ELIMITY CHARACTER(MULLERITH) TITLE.	FIT	691
C		FIT	701
C	TITL(1)=CHARACTER FOR CALLING SUBROUTINE SELECT TO CHOOSE DATA	FIT	711
C	TO BE USED IN FIT. IF TITL(1)= SELECT ,SEE SUBROUTINE	FIT	721
C	SELECT FOR INPUT.	FIT	731
C	IF TITL(1)= DO NOT GO, PROGRAM STOPS. USED WHEN JUST	FIT	741
C	REBINNED DATA DESIRED.	FIT	751
C		FIT	761
	IF (TITL(1).EQ.10H SELECT) CALL SELECT	FIT	771
	WRITE (NOUT,160) (TITL(I),I=1,8)	FIT	781
	IF (TITL(1).EQ.10H DO NOT GO) STOP	FIT	791
	READ (NIN,170) IPROB,NTOTER,NPUN,NSTEP,NFINL	FIT	801
C		FIT	811
C	IPROB = PROBLEM NO. MAKE NEGATIVE IF FIT IS MADE IN SEGMENTS.	FIT	821
C	NTOTER = FLAG TO DENOTE SPEC. OR TOTAL CALC.,=0, CODE READS SPEC.	FIT	831
C	DATA FROM TAPE FILE,=1, CODE READS TOTAL DATA FROM CARDS.	FIT	841
C	NPUN = FLAG FOR PUNCH,=7, PUNCH ALPHAS AND LAMDAAS,=20, NO PUNCH.	FIT	851
C	NSTEP = FLAG TO CALL DMFIT ROUTINE WHICH FITS BOTH ALPHAS AND	FIT	861
C	LAMDAAS,=0, ROUTINE NOT CALLED,=1, ROUTINE CALLED. ROUTINE	FIT	871
C	USUALLY NOT CALLED UNTIL A COUPLE OF PASSES ARE MADE TO	FIT	881
C	ADJUST THE PARAMETERS WITH THE SINGLE FIT ALONE. SEE	FIT	891
C	SUBROUTINE PULSFIT WHERE POINTS ARE SELECTED FOR FIT.	FIT	901
C	NFINL = FLAG FOR READING ALL PARAMETERS FROM PREVIOUS PROB,=1,=0,	FIT	911
C	PULSFIT WILL NOT BE CALLED FOR ANY GROUP,=0, NO EFFECT,=1,	FIT	921
C	SEE READ STATEMENTS BELOW.	FIT	931
C		FIT	941
	IF (NTOTER.GT.0) CALL RUNTOTS	FIT	951
	READ (NIN,180) DIFLIM,RUNTIM,TMIN,TMAX,GXMIN	FIT	961
C		FIT	971
C	DIFLIM = MAX. PERCENT POINTWISE DEVIATION ALLOWED IN STEPIT.	FIT	981
C	USUALLY SET HIGH ON INITIAL PASSES AND TIGHTENED UP IN	FIT	991
C	SUBSEQUENT PASSES.	FIT	1001
C	RUNTIM = RUNNING TIME. MAKE FRACT. OF SECOND LESS THAN THAT USED	FIT	1011
C	ON CONTROL CARD TO GET PUNCHED CARDS FOR SUBSEQUENT RUN.	FIT	1021
C	TMIN = LOWEST COOLING TIME DESIRED.	FIT	1031
C	TMAX = HIGHEST COOLING TIME DESIRED.	FIT	1041
C	GXMIN = MINIMUM ALLOWED VALUE OF GX(I,K). THIS SHOULD BE SET	FIT	1051
C	SO NO FIT IS ATTEMPTED OVER MORE THAN ABOUT 15 DECADES.	FIT	1061
C		FIT	1071
	NP=IISP	FIT	1081
	IF (I(1).LE.0.0) T(1)=1.E-4	FIT	1091
	IF (I(NP).LE.0.0) NP=NP-1	FIT	1101
	DO 10 N=1,NP	FIT	1111
	TC(N)=T(N)	FIT	1121
10	CONTINUE	FIT	1131
	NE=NERG	FIT	1141
	NRDS=NE+1	FIT	1151
	EB(NBUS)=7.5	FIT	1161
		FIT	1171

C	KKN = FLAG FOR CALLING STEPIT BY GROUP, =0, NO CALL, =GROUP NO.,	FIT 1181
C	STEPIT ROUTINE CALLED, =NEGATIVE GROUP NO., TRMSEE ROUTINE	FIT 1191
C	CALLED. NOTE IF NSTEP =0, KKN NOT ACTIVATED.	FIT 1201
C		FIT 1211
C	READ (NIN, 170) (KKN(K), K=1, NERG)	FIT 1221
		FIT 1231
C		
C	OUTPUT CARDS FROM PREVIOUS PROBLEM ARE READ HERE IF NFINL=1.	FIT 1241
C		FIT 1251
	IF (NFINL.NE.1) GO TO 30	FIT 1261
	READ (NIN, 150) (ITL(I), I=1, R)	FIT 1271
	READ (NIN, 220) C1, C2, NUL, NLU, NUL, NERG	FIT 1281
	DO 20 K=1, NERG	FIT 1291
	READ (NIN, 220) EB(K), EB(K+1), NUL, NUL, NUL, KNG	FIT 1301
	READ (NIN, 220) TMN(K), TMX(K), NUL, NUL, NUL, KTR(K)	FIT 1311
	KTRM=KTR(K)	FIT 1321
	READ (NIN, 230) (ALF(K, L), ALAM(K, L), L=1, KTRM)	FIT 1331
	KXX=KKN(K)	FIT 1341
	IF (KXX.LT.0) CALL TRMSEE (K, 1)	FIT 1351
	IF (KXX.LT.0) CALL TRMSEE (K, 0)	FIT 1361
	KTR(N)=KTRM	FIT 1371
20	CONTINUE	FIT 1381
	GO TO 100	FIT 1391
30	CONTINUE	FIT 1401
	DO 90 K=1, NERG	FIT 1411
		FIT 1421
C		
C	THIS PORTION OF ROUTINE ALLOWS FIT IN SEVERAL SEGMENTS. TO	FIT 1431
C	ACTIVATE, SET IPROB NEGATIVE. NOTE = INPUT NEEDED FOR EA. GROUP.	FIT 1441
C		FIT 1451
C	NSEG = NUMBER OF SEGMENTS + 1	FIT 1461
C	NS = BREAKPOINTS OF SEGMENTS.	FIT 1471
C		FIT 1481
	NSEG=2	FIT 1491
	NS(1)=1	FIT 1501
	IF (IPROB.LT.0) READ (NIN, 170) NSEG, (NS(LX), LX=2, NSEG)	FIT 1511
C		FIT 1521
	IF (NSEG.LE.2) NS(2)=NP	FIT 1531
	NSEG1=NSEG-1	FIT 1541
	LTRM=0	FIT 1551
	KTR(N)=0	FIT 1561
	DO 60 N=1, NSEG1	FIT 1571
	N1=NS(N)	FIT 1581
	N2=NS(N+1)	FIT 1591
	ITP=N2-N1+1	FIT 1601
	ITSP=0	FIT 1611
	IX=0	FIT 1621
	IF (IMIN.LT.TC(1)) TMIN=TC(1)	FIT 1631
	IF (IMAX.LE.0.0) TMAX=TC(NP)	FIT 1641
	IF (IMAX.GT.TC(NP)) TMAX=TC(NP)	FIT 1651
	DO 40 I=1, ITP	FIT 1661
	NN=N1+I-1	FIT 1671
	IF (GX(K, NN).LT.GXMIN) GO TO 40	FIT 1681
	IF (TC(NN).LT.TMIN) GO TO 40	FIT 1691
	IF (TC(NN).GT.TMAX) GO TO 40	FIT 1701
	IX=IX+1	FIT 1711
	ITSP=IX	FIT 1721
	LXX(N)=IX	FIT 1731
	FX(IX)=GX(K, NN)	FIT 1741
	T(IX)=TC(NN)	FIT 1751
40	CONTINUE	FIT 1761
	CALL PULSEIT (K)	FIT 1771
	IF (N.NE.NSEG1) KTRM=KTRM-1	FIT 1781
	DO 50 J=1, KTRM	FIT 1791
	LTRM=LTRM+1	FIT 1801
	ALF(K, LTRM)=B(J, 1)	FIT 1811
	ALAM(K, LTRM)=ALAMDA(J)	FIT 1821
	IF (ALAMDA(KTRM).GT.ALAMDA(KTRM-1)) KTRM=KTRM-1	FIT 1831
50	CONTINUE	FIT 1841
	KTR(N)=KTR(K)+KTRM	FIT 1851
60	CONTINUE	FIT 1861
	KTRM=KTR(K)	FIT 1871

DO 70 J=1,KTRM	FIT 1881
ALAMDA(J)=ALAM(K,J)	FIT 1891
B(J,1)=ALF(K,J)	FIT 1901
70 CONTINUE	FIT 1911
WRITE (NOUT,190) K,EB(K),EB(K+1)	FIT 1921
DO 80 J=1,KTRM	FIT 1931
WRITE (NOUT,200) J,ALAMDA(J),B(J,1)	FIT 1941
80 CONTINUE	FIT 1951
90 CONTINUE	FIT 1961
100 CONTINUE	FIT 1971
DO 140 K=1,NERG	FIT 1981
IX=0	FIT 1991
IF (IMIN.LT.TC(1)) TMIN=TC(1)	FIT 2001
IF (IMAX.LE.0.0) TMAX=TC(NP)	FIT 2011
IF (IMAX.GT.TC(NP)) TMAX=TC(NP)	FIT 2021
DO 140 I=1,NP	FIT 2031
IF (GX(K,I).LT.GXMIN) GO TO 110	FIT 2041
IF (IC(I).LT.IMIN) GO TO 110	FIT 2051
IF (IC(I).GT.IMAX) GO TO 110	FIT 2061
IX=IX+1	FIT 2071
ITSP=1A	FIT 2081
LXX(K)=IX	FIT 2091
FX(IA)=GX(K,I)	FIT 2101
T(I)=TC(I)	FIT 2111
110 CONTINUE	FIT 2121
KTRM=KTR(K)	FIT 2131
DO 120 L=1,KTRM	FIT 2141
ALAMDA(L)=ALAM(K,L)	FIT 2151
B(L,1)=ALF(K,L)	FIT 2161
120 CONTINUE	FIT 2171
KK1=KKN(K)	FIT 2181
KK2=KKV(K)	FIT 2191
IF (KK2.EQ.K) KK1=K	FIT 2201
IF (K.NE.KK1) GO TO 130	FIT 2211
IF (INSTEP.LE.0) GO TO 130	FIT 2221
WRITE (NOUT,160) (TITL(I),I=1,8)	FIT 2231
WRITE (NOUT,210) K	FIT 2241
KTRM=KTR(K)	FIT 2251
IF (INSTEP.GT.0) CALL DMFIT (K)	FIT 2261
KTR(N)=KTRM	FIT 2271
130 CONTINUE	FIT 2281
CALL PINECHK (K)	FIT 2291
140 CONTINUE	FIT 2301
IF (INPUN.EQ.7) CALL PCHOUT (LXX)	FIT 2311
STOP	FIT 2321
C	FIT 2331
150 FORMAT (8A10)	FIT 2341
160 FORMAT (1H1,10X,8A10)	FIT 2351
170 FORMAT (12I6)	FIT 2361
180 FORMAT (6E12.5)	FIT 2371
190 FORMAT (1H1,24H RESULTS FOR GROUP NO. ,I3,11H E-LOWER = ,1PE12.5,	FIT 2381
1 17H MEV. E-UPPER = ,1PE12.5,5H MEV.)	FIT 2391
200 FORMAT (1H0,4H J =,I3,9H ALAMDA =,1PE12.5,4H B =,1PE12.5)	FIT 2401
210 FORMAT (1H0,35H STEPIT HAS BEEN CALLED FOR GROUP ,I3)	FIT 2411
220 FORMAT (2E11.4,4I11,I4,I2,I3,I5)	FIT 2421
230 FORMAT (6E11.4)	FIT 2431
END	FIT 2441
SUBROUTINE SELECT	
C	SEL 10
C THIS ROUTINE USED FOR SELECTING A SUBSET OF THE DATA TO BE FIT.	SEL 20
C	SEL 30
COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPKUB,	SEL 40
1 NIN, NOUT	SEL 50
COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(25,	SEL 60
1 5,50)	SEL 70
COMMON /PULSCAL/ A(50,50), B(50,1)	SEL 80

C	COMMON /MANI/ WX(100), TITL(8), IPT(50), NS(10), KKN(25), DIP LIM	SEL 90
	READ (NIN,50) ITS,(IPT(I),I=1,ITS)	SEL 100
C		SEL 110
C	ITSEND OF TIME STEPS DESIRED.	SEL 120
C	IPT=INDEXES OF DESIRED TIME STEPS.	SEL 130
C		SEL 140
	DO 20 K=1,NERG	SEL 150
	DO 10 I=1,ITS	SEL 160
	II=IPT(I)	SEL 170
	ALAMDA(I)=T(II)	SEL 180
	A(K,I)=GX(K,II)	SEL 190
10	CONTINUE	SEL 200
20	CONTINUE	SEL 210
	DO 40 K=1,NERG	SEL 220
	DO 30 I=1,ITS	SEL 230
	GX(K,I)=A(K,I)	SEL 240
	T(I)=ALAMDA(I)	SEL 250
30	CONTINUE	SEL 260
	WRITE (NOUT,60) (I,T(I),GX(K,I),I=1,ITS)	SEL 270
40	CONTINUE	SEL 280
	ITSP=ITS	SEL 290
	RETURN	SEL 300
C		SEL 310
	50 FORMAT (12I6)	SEL 320
	60 FORMAT (4H I=,I3,3H T=,1E12,5,4H GX=,1E12,5)	SEL 330
	END	SEL 340
		SEL 350

	SUBROUTINE TRMSEL (LK,KKX)	TRM
C		TRM 10
C	THIS ROUTINE IS CALLED IF KKN IS SET NEGATIVE FOR A GROUP.	TRM 20
C	ROUTINE PRINTS OUT TERM BY TERM CALCULATION OF FX FOR USE IN	TRM 30
C	ADJUSTING FITTING PARAMETERS. THIS DONE BY CHANGING AND/OR	TRM 40
C	REMOVING PARAMETERS.	TRM 50
C		TRM 60
	COMMON /MANI/ WX(100), TITL(8), KTR(50), NS(10), KKN(25), DIP LIM	TRM 70
	COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPKUB,	TRM 80
	1 NIN, NOUT	TRM 90
	COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(2	TRM 100
	1 5,50)	TRM 110
	COMMON /PULSCAL/ TRM(50,50), TPRT(50)	TRM 120
	COMMON /FINRAD/ IRAD, NCONS, RADT(200), DELT(200)	TRM 130
	COMMON /TRMOT/ TL(10), LTM(50), LT	TRM 140
C		TRM 150
	K=LK	TRM 160
	KTRM=KTR(K)	TRM 170
	TL(1)=10HORIGINAL P	TRM 180
	TL(2)=10HPARAMTRS F	TRM 190
	TL(3)=10HGR GROUP	TRM 200
	IF (KKX.EQ.0) GO TO 10	TRM 210
	WRITE (NOUT,150) (TL(I),I=1,3),K	TRM 220
	WRITE (NOUT,150) (L,ALF(K,L),ALAM(K,L),L=1,KTRM)	TRM 230
10	IF (KKX.GT.0) GO TO 90	TRM 240
	DO 40 I=1,ITSP	TRM 250
	FX(I)=0.	TRM 260
	DO 30 L=1,KTRM	TRM 270
	TRM(I,L)=ALF(K,L)*EXP(-ALAM(K,L)*T(I))	TRM 280
	IF (IRAD.LE.0) GO TO 20	TRM 290
	IF (TRM(I,L).LT.0.) TRM(I,L)=0.	TRM 300
	COFF*ALF(K,L)/DELT(I)/ALAM(K,L)**2	TRM 310
	XPO1=1.-EXP(-ALAM(K,L)*RADT(I))	TRM 320
	XPO2=1.-EXP(-ALAM(K,L)*DELT(I))	TRM 330
	XPO3=EXP(-ALAM(K,L)*(T(I)-DELT(I)/2.))	TRM 340
20	CONTINUE	TRM 350
	IF (IRAD.EQ.1) TRM(I,L)=COFF*XPO1*XPO2*XPO3	TRM 360
	LTM(L)=L	TRM 370
	FX(I)=FX(I)+TRM(I,L)	TRM 380

30	CONTINUE	TRM	390
40	CONTINUE	TRM	400
	K1=1	TRM	410
50	K2=K1+4	TRM	420
	IF (K2.GT.KTRM) K2=KTRM	TRM	430
	WRITE (NOUT,170) (LTM(L),L=K1,K2)	TRM	440
	DO 50 I=1,ITSP	TRM	450
	WRITE (NOUT,180) T(I),GX(K,I),(TRM(I,L),L=K1,K2)	TRM	460
60	CONTINUE	TRM	470
	K1=K2+1	TRM	480
	IF (K1.LE.KTRM) GO TO 50	TRM	490
	DO 80 I=1,ITSP	TRM	500
	PCTDIF=0.	TRM	510
	IF (GX(K,I).LE.0.) GO TO 70	TRM	520
	PCTDIF=(GX(K,I)-FX(I))/GX(K,I)*100.	TRM	530
70	CONTINUE	TRM	540
	WRITE (NOUT,190) I,T(I),GX(K,I),FX(I),PCTDIF	TRM	550
80	CONTINUE	TRM	560
	IF (KXX.LE.0) RETURN	TRM	570
90	CONTINUE	TRM	580
	READ (NIN,210) MLT	TRM	590
	IF (MLT.EQ.0) GO TO 110	TRM	600
	DO 100 MM=1,MLT	TRM	610
	READ (NIN,200) L,ALF(K,L),ALAM(K,L)	TRM	620
100	CONTINUE	TRM	630
110	CONTINUE	TRM	640
	READ (NIN,210) LT,(LTM(JJ),JJ=1,LT)	TRM	650
C		TRM	660
C	MLT=NO OF PARAMETERS TO BE CHANGED	TRM	670
C	LT = NUMBER OF TERMS TO BE REMOVED.	TRM	680
C	LTM(L) = TERM NOS. OF TERMS TO BE REMOVED.	TRM	690
C		TRM	700
	IF (LT.EQ.0) RETURN	TRM	710
	LTX=0	TRM	720
	LL=1	TRM	730
	KTRM=KTR(K)	TRM	740
	DO 120 L=1,KTRM	TRM	750
	IF (LIM(LL).EQ.L) GO TO 120	TRM	760
	LTX=LTX+1	TRM	770
	TRM(1,LTX)=ALF(K,L)	TRM	780
	TRM(2,LTX)=ALAM(K,L)	TRM	790
	GO TO 130	TRM	800
120	CONTINUE	TRM	810
	LL=LL+1	TRM	820
130	CONTINUE	TRM	830
	KTRM=LTX	TRM	840
	DO 140 L=1,KTRM	TRM	850
	ALF(K,L)=TRM(1,L)	TRM	860
	ALAM(K,L)=TRM(2,L)	TRM	870
140	CONTINUE	TRM	880
	TL(1)=10HREVISED PA	TRM	890
	TL(2)=10HNAMEIERS F	TRM	900
	KTR(K)=KTRM	TRM	910
	TL(3)=10HUR GROUP	TRM	920
	WRITE (NOUT,150) (TL(I),I=1,3),K	TRM	930
	WRITE (NOUT,160) (L,ALF(K,L),ALAM(K,L),L=1,KTRM)	TRM	940
	RETURN	TRM	950
C		TRM	960
150	FORMAT (1H,5X,3A10,I3)	TRM	970
160	FORMAT (1H,3H I=,I3,10H ALF(K,L)=,1PE11.4,11H ALAM(K,L)=,1PE11.4)	TRM	980
170	FORMAT (1H,25H COUL TIME GX,5I15)	TRM	990
180	FORMAT (1P7E15.5)	TRM	1000
190	FORMAT (1H,3H I=,I3,3H T=,1E12.5,4H GX=,1E12.5,4H FX=,1E12.5,8H P	TRM	1010
	1CTDIF=,1E12.5)	TRM	1020
200	FORMAT (16,2E12.5)	TRM	1030
210	FORMAT (16I6)	TRM	1040
	END	TRM	1050

	SUBROUTINE COHRAIN	COH	
C		COH	10
C	ROUTINE FORMS COARSE GROUPS FROM FINE GROUP DATA IN ENDF-LIKE	COH	20
C	FORMAT.	COH	30
C		COH	40
	COMMON /PULSIN/ A0(50), FX(200), T(401), KE, ITSP, IPROR, NIN,	COH	50
	1 NOUI	COH	60
	COMMON /PULSOAT/ NDF, EB(25), GR(25,400), NERG, F0(200), DUM(70),	COH	70
	1 TOT(50)	COH	80
	COMMON /ENDF/ MAT1, MF1, MT1, RUNTIM, NPUN	COH	90
C	READ INPUT	COH	100
	READ (NIN,90) MAT1,MF1,MT1	COH	110
C		COH	120
C	MAT1=MAT NO. OF FISSIONING NUCLIDE DESIRED.	COH	130
C	MF1=DAT TYPE DESIRED,MF1=80=F.P.DAT FOR THERMAL PULSE,MF1=81=	COH	140
C	F.P. DATA FOR FAST PULSE,ETC.	COH	150
C	MT1=TYPE OF F.P. WANTED,MT1=801=DATA FOR BETA- PLUS GAMMA,MT1=802=	COH	160
C	DAT FOR GAMMA ONLY,MT1=803=DATA FOR BETA- ONLY,ETC.	COH	170
C		COH	180
C	SEARCH ENDF TAPE FOR DESIRED DATA.	COH	190
C		COH	200
10	CONTINUE	COH	210
	READ (NDF,100) (A0(I),I=1,7),MAT,MF,MT,NSEQ	COH	220
	IF (MF.EQ.-0) MF=80	COH	230
	IF (MAT.EQ.-1) WRITE (NOUT,110) MAT,NDF	COH	240
	IF (MAT.EQ.-1) STOP	COH	250
	IF (MAT.LI,MAT1) GO TO 10	COH	260
	IF (MAT.EQ,MAT1) GO TO 20	COH	270
	WRITE (NOUT,110) MAT1,NDF	COH	280
	STOP	COH	290
20	CONTINUE	COH	300
	IF (MF.LI,MF1) GO TO 10	COH	310
	IF (MF.EQ,MF1) GO TO 30	COH	320
	WRITE (NOUT,120) MF1,NDF	COH	330
	STOP	COH	340
30	CONTINUE	COH	350
	IF (MT.LI,MT1) GO TO 10	COH	360
	IF (MT.EQ,MT1) GO TO 40	COH	370
	WRITE (NOUT,130) MT1,NDF	COH	380
	STOP	COH	390
40	CONTINUE	COH	400
	READ (NDF,140) NT	COH	410
	READ (NDF,90) NIGHT	COH	420
	ITSP=NT	COH	430
C		COH	440
C	READ BROAD GROUP STRUCTURE	COH	450
C		COH	460
	READ (NIN,90) NE	COH	470
	READ (NIN,150) (ER(N),N=1,NE)	COH	480
C		COH	490
C	NE=NU OF BROAD GROUPS PLUS ONE.	COH	500
C	ER=ENERGY BOUNDS INCLUDING UPPER AND LOWER BOUNDS IN MEV	COH	510
	NE=NE-1	COH	520
	NERG=NE	COH	530
	DO 70 IT=1,NT	COH	540
	READ (NDF,160) T(IT),KE	COH	550
	READ (NDF,90) NIGHT	COH	560
	READ (NDF,150) (E0(K),FX(K),K=1,KE)	COH	570
	KE]=KE+1	COH	580
	E0(KE+1)=(E0(KE)-E0(KE-1))*E0(KE)	COH	590
C		COH	600
C	THE PULLING LOOP CHANGES UNITS TO MEV/SEC. THE TIME DURATION	COH	610
C	OF THE PULSE IS ASSUMED TO BE 1.E-4 SEC.	COH	620
C		COH	630
	DO 50 K=1,KE	COH	640
	FX(K)=FX(K)/1.E-4	COH	650
50	CONTINUE	COH	660
	CALL HEBIN	COH	670
	DO 60 IE=1,NE	COH	680

	GB(IE,IT)=DUM(IE)	COR	690
60	CONTINUE	COR	700
70	CONTINUE	COR	710
	DO 80 IE=1,NE	COR	720
	WRITE (NOUT,170) IE,EB(IE),EB(IF+1)	COR	730
	WRITE (NOUT,180) (IT,T(IT),GB(IE,IT),IT=1,NT)	COR	740
	WRITE (NPUN,90) MAT1,MF1,MT1	COR	750
	WRITE (NPUN,90) NE,NT	COR	760
	WRITE (NPUN,190) IE,EB(IE),EB(IF+1)	COR	770
	WRITE (NPUN,190) (IT,T(IT),GB(IE,IT),IT=1,NT)	COR	780
80	CONTINUE	COR	790
	REWIND 10	COR	800
	RETURN	COR	810
C		COR	820
	90 FORMAT (6I11)	COR	830
100	FORMAT (6A10,A6,I4,I2,I3,I5)	COR	840
110	FORMAT (1H1,13H SORRY, MAT = ,I4,13H NOT ON TAPE ,I3)	COR	850
120	FORMAT (1H1,14H SORRY, MF = ,I4,13H NOT ON TAPE ,I3)	COR	860
130	FORMAT (1H1,14H SORRY, MT = ,I4,13H NOT ON TAPE ,I3)	COR	870
140	FORMAT (55X,I11)	COR	880
150	FORMAT (6E11.4)	COR	890
160	FORMAT (11X,1E11.4,33X,I11)	COR	900
170	FORMAT (1H0,17H ENERGY BIN NO. ,I3,6H FROM ,1PE12.5,6H MEV TO ,1PE12.5,6H MEV.)	COR	910
180	FORMAT (1H ,13H TIME STEP = ,I3,16H COOLING TIME = ,1PE12.5,6H FA	COR	920
	1= ,1PE12.5)	COR	930
190	FORMAT (2(I11,2E11.4))	COR	940
	END	COR	950
		COR	960
	SUBROUTINE REBIN	REB	
C		REB	10
C	ROUTINE FOR BROAD GROUP BINNING. BOUNDARIES DO NOT HAVE TO	REB	20
C	COINCIDE WITH FINE GROUP BOUNDARIES. WRITTEN BY GRAHAM	REB	30
C	FOSTER,LASL,1975.	REB	40
C	CHANGED OCT, 1977, LASL, D. GEORGE	REB	50
C		REB	60
	COMMON /PULSIN/ A0(50), Y(200), T(401), NX, ITSP, IPROR, NIN, NOUT,REB		70
	COMMON /PULSDAT/ NDT, U(25), GB(25,400), NU, X(200), V(70), [U1(SURCH		80
	1)	REB	90
	SUM1=SUM2=0.	REB	100
	NUJ=NU+1	REB	110
	NX1=NX+1	REB	120
	DO 10 IU=1,NU1	REB	130
10	V(IU)=0.	REB	140
	DO 20 IX=1,NX	REB	150
	SUM1=SUM1+Y(IX)	REB	160
20	CONTINUE	REB	170
C	FIND THE FIRST BIN	REB	180
	DO 30 IX=1,NX	REB	190
	IF (A(IX).EQ.U(1)) GO TO 50	REB	200
30	IF (A(IX).GT.U(1)) GO TO 40	REB	210
	WRITE (NOUT,110)	REB	220
	RETURN	REB	230
40	V(1)=Y(IX-1)*(X(IX)-U(1))/(X(IX)-X(IX-1))	REB	240
50	IX=IX+1	REB	250
	DO 80 IU=1,NU	REB	260
60	IF (A(IX).GT.U(IU+1)) GO TO 70	REB	270
	V(IU)=V(IU)+Y(IX-1)	REB	280
	IF (A(IX).GT.NX) GO TO 90	REB	290
	IX=IX+1	REB	300
	GO TO 60	REB	310
70	V(IU)=V(IU)+Y(IX-1)*(U(IU+1)-X(IX-1))/(X(IX)-X(IX-1))	REB	320
80	CONTINUE	REB	330
90	IF (A(NX1).GT.U(NU1)) WRITE (NOUT,120) X(NX1),U(NU1)	REB	340
	DO 100 IU=1,NU	REB	350
100	SUM2=SUM2+V(IU)	REB	360

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      EHRD=0.001
      IF (ABS(SUM2-SUM1).GT.EHRD*SUM1) WRITE (NOUT,130) SUM1,SUM2
      RETURN
C
110 FORMAT (2YH CANT FIND FIRST ENERGY BOUND)
120 FORMAT (1/H0**** LAST DATUME10.3,27H EXTENDS BEYOND END OF GRID)
1 0.3,6H *****/)
130 FORMAT (32H0**** INTEGRAL BEFORE REBINNING E10.3,41H DOES NOT SQUARE
1L INTEGRAL AFTER REBINNING E10.3,6H *****/)
      END
      REB 370
      REB 380
      REB 390
      REB 400
      REB 410
      REB 420
      REB 430
      REB 440
      REB 450
      REB 460

SUBROUTINE RUNTOT5
C
C ROUTINE TO READ TOTALS, I.E., GX(K,I) SUMMED OVER ENERGY.
C
COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPROB,
1 NIN, NOUT
COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(2
1 5,50)
COMMON /PULSCAL/ A(50,50), R(50,1)
COMMON /PULSOUT/ ALPHA(50), FXC(100), PCT(100)
COMMON /FINRAD/ IRAD, NCOMS, RANT(200), DELT(200)
C
C THIS SUBROUTINE IS USED FOR READING EXPERIMENTAL DATA.
C UNFORTUNATELY, THIS CAN BE RECEIVED IN A VARIETY OF FORMATS, SO
C THIS ROUTINE MUST BE CONTINUALLY CHANGED TO ACCOMMODATE WHATEVER
C FORMAT THE DATA IS IN. THE FUNNY LOOKING STATEMENTS BELOW ARE
C FOR READING SOME ORNL DATA IN THE WHITTEMORE JUNK FORMAT.
C
DIMENSION HDR(8)
READ (NIN,30) NP,NE,NHD
DO 10 I=1,NHD
  READ (NIN,50) (HDR(I),I=1,8)
  WRITE (NOUT,50) (HDR(I),I=1,8)
10 CONTINUE
DO 20 I=1,NP
  IF (1.LE.NE) EB(I)=0.0
  READ (NIN,40) (GX(K,I),K=10,15)
  WRITE (NOUT,40) (GX(K,I),K=10,15)
  RANT(I)=GX(10,I)
  T(I)=GX(11,I)+GX(12,I)/2.0
  DELT(I)=1.0
  GX(1,I)=(GX(13,I)+GX(14,I))*GX(10,I)/GX(12,I)
20 CONTINUE
ITSP=NP
NF=1
NERG=1
RETURN
C
30 FORMAT (12I6)
40 FORMAT (6E12.5)
50 FORMAT (8A10)
      END
      RUN 10
      RUN 20
      RUN 30
      RUN 40
      RUN 50
      RUN 60
      RUN 70
      RUN 80
      RUN 90
      RUN 100
      RUN 110
      RUN 120
      RUN 130
      RUN 140
      RUN 150
      RUN 160
      RUN 170
      RUN 180
      RUN 190
      RUN 200
      RUN 210
      RUN 220
      RUN 230
      RUN 240
      RUN 250
      RUN 260
      RUN 270
      RUN 280
      RUN 290
      RUN 300
      RUN 310
      RUN 320
      RUN 330
      RUN 340
      RUN 350
      RUN 360
      RUN 370
      RUN 380
      RUN 390
      RUN 400
      RUN 410

SUBROUTINE DMFIT (K)
C
C ROUTINE WITH SUBROUTINES FUNK AND STEPIT PERFORM TWO PARAMETER
C FITS, I.E. BOTH ALF AND ALAM. ADAPTATION OF STEPIT CODE BY
C M.G. DIAMANTALAS, LASL, 1976, FOR THIS APPLICATION.
C
COMMON /PULSIN/ ALAMDA(50), DM(200), T(100), NERS, PERDIF(100),
1 CALC(100), W(100), KTRM, ITSP, IPROB, NIN, NOUT
COMMON /PULSDAT/ NDT, EB(25), HOLD(25,100), NV, NTRACE, MASK(70),
1 X(70), XMAX(70), XMIN(70), DELTAX(70), DELMIN(70), DUMMY, MAIRIA,
2 ERR(70,70), CHISO, BSAV(100), VEL(70), TRIAL(70), XSAVE(70), CHI
      DMF 10
      DMF 20
      DMF 30
      DMF 40
      DMF 50
      DMF 60
      DMF 70
      DMF 80
      DMF 90
      DMF 100

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3	70)	SECOND(2,2), OLDVEC(70), SALVO(70), AOSC(70,15), CHIOSC(15), DHF	110
4	DHM(506), NERG, ALF(22,50), ALAM(25,50)	DHF	120
	COMMON /MANI/ TC(100), TITL(8), KTR(50), NS(10), KKN(25), DIP LIM	DHF	130
	COMMON /ENDE/ MAT, MF, MT, RUNTIM, NPUN	DHF	140
	COMMON /FINRAU/ IRAD, NCONS, RAOT(200), DELT(200)	DHF	150
	DIMENSION TTL(10), XLL(10), YLL(10)	DHF	160
	DO 10 KK=1,KTRM	DHF	170
	II=2*KK-1	DHF	180
	IJ=2*KK	DHF	190
	X(II)=ALF(K,KK)	DHF	200
	X(IJ)=ALAM(K,KK)	DHF	210
10	CONTINUE	DHF	220
	NV=2*KTRM	DHF	230
	IF (NV.LE.70) GO TO 20	DHF	240
	WRITE (NOUT,150) NV	DHF	250
	RETURN	DHF	260
20	CONTINUE	DHF	270
	DO 30 I=1,NV,2	DHF	280
	XMIN(I)=X(I)*0.1	DHF	290
	IF (X(I).LT.0.) XMIN(I)=10.*X(I)	DHF	300
	XMAX(I)=X(I)*10.	DHF	310
	IF (X(I).GT.0.) XMAX(I)=X(I)*0.1	DHF	320
	XMIN(I+1)=0.5*X(I+1)	DHF	330
	XMAX(I+1)=2.0*X(I+1)	DHF	340
30	CONTINUE	DHF	350
	WRITE (NOUT,160)	DHF	360
	WRITE (NOUT,170) (X(I),I=1,NV)	DHF	370
	WRITE (NOUT,180)	DHF	380
	WRITE (NOUT,170) (XMIN(I),I=1,NV)	DHF	390
	WRITE (NOUT,190)	DHF	400
	WRITE (NOUT,170) (XMAX(I),I=1,NV)	DHF	410
	DO 40 I=1,NV	DHF	420
	DELTMA(I)=0.1*X(I)	DHF	430
	DELMIN(I)=0.001*X(I)	DHF	440
40	MASK(I)=0	DHF	450
	NERS=ITSP	DHF	460
	DO 50 I=1,NERS	DHF	470
	QW=1.	DHF	480
50	W(I)=(1./DH(I))*QW	DHF	490
	CHSQ=0.	DHF	500
	DO 100 I=1,NERS	DHF	510
	CALC(I)=0.	DHF	520
	DO 90 J=1,NV,2	DHF	530
	IF (IMAD.LE.0) GO TO 60	DHF	540
	COFF=A(J)/DELT(I)/X(J+1)**2	DHF	550
	XP01=1.-EXP(-X(J+1)*RAOT(I))	DHF	560
	XP02=1.-EXP(-X(J+1)*DELT(I))	DHF	570
	XP03=EXP(-X(J+1)*(T(I)-DELT(I)/2.))	DHF	580
	CALC(I)=CALC(I)+COFF*XU1*XP02*XP03	DHF	590
	GO TO 90	DHF	600
60	TEMP=A(J+1)*T(I)	DHF	610
	IF (ABS(TEMP).LE.600) GO TO 70	DHF	620
	XP0=0.	DHF	630
	GO TO 80	DHF	640
70	XP0=A(J)*EXP(-TEMP)	DHF	650
80	CALC(I)=CALC(I)+XP0	DHF	660
90	CONTINUE	DHF	670
	PERDIF(I)=100.*(CALC(I)/DH(I)-1.)	DHF	680
100	CHSQ=CHSQ+(CALC(I)-DH(I))*(CALC(I)-DH(I))*W(I)*W(I)	DHF	690
	WRITE (NOUT,200) CHSQ	DHF	700
	WRITE (NOUT,210)	DHF	710
	WRITE (NOUT,220)	DHF	720
	WRITE (NOUT,230) (T(I),DH(I),CALC(I),PERDIF(I),I=1,NERS)	DHF	730
	CALL STEPIT	DHF	740
	DO 100 I=1,NERS	DHF	750
	CALC(I)=0.	DHF	760
	DO 100 J=1,NV,2	DHF	770
	IF (IMAD.LE.0) GO TO 110	DHF	780
	COFF=A(J)/DELT(I)/X(J+1)**2	DHF	790

	XP01=1.-EXP(-X(J+1)*RAUT(I))	DHF	800
	XP02=1.-EXP(-X(J+1)*DEL(I))	DHF	810
	XP03=EXP(-X(J+1)*(T(I)-DELT(I)/2.))	DHF	820
	CALC(I)=CALC(I)+COFF*XP01*XP02*XP03	DHF	830
	GO TO 120	DHF	840
110	TEMP=X(J+1)*T(I)	DHF	850
	IF (ABS(TEMP).GT.600) GO TO 120	DHF	860
	CALC(I)=CALC(I)+X(J)*EXP(-TEMP)	DHF	870
120	CONTINUE	DHF	880
	DO 130 I=1, NERS	DHF	890
130	PERDIF(I)=100.*(CALC(I)/DH(I)-1.)	DHF	900
	WRITE (NOUT,220)	DHF	910
	WRITE (NOUT,230) (T(I),DH(I),CALC(I),PERDIF(I),I=1,NERS)	DHF	920
	ENCODE (3*,240,TIL(1)) K	DHF	930
	ENCODE (20,250,XLL)	DHF	940
	ENCODE (20,260,YLL)	DHF	950
C	CALL PLOTM (I,PERDIF,-NERS,1,0,0,0,1,1,1,TIL,34,XLL,20,YLL,20)	DHF	960
	DO 140 J=1,KTRM	DHF	970
	II=2*J-1	DHF	980
	IJ=2*J	DHF	990
	ALF(N,J)=X(II)	DHF	1000
	ALAM(K,J)=X(IJ)	DHF	1010
140	CONTINUE	DHF	1020
	RETURN	DHF	1030
C		DHF	1040
150	FORMAT (24H0 TOO MANY TERMS. NV =,I3)	DHF	1050
160	FORMAT (10H,10X,1AHINITIAL PARAMETERS,/))	DHF	1060
170	FORMAT (1H,20X,6E12.4)	DHF	1070
180	FORMAT (1H,10X,12HLOWER LIMITS,/))	DHF	1080
190	FORMAT (1H,10X,12HUPPER LIMITS,/))	DHF	1090
200	FORMAT (1H,10X,36HCHI-SQUARE WITH ORIGINAL GUESSES IS ,E12.4)	DHF	1100
210	FORMAT (10H,10X,31HCOMPARISON WITH INITIAL GUESSES,/))	DHF	1110
220	FORMAT (10H,10X,1HT,10X,2HDH,9X,4HCALC,7X,6HPERDIF,/))	DHF	1120
230	FORMAT (1H,4E12.4)	DHF	1130
240	FORMAT (32HPERCENT DEVIATION FOR GROUP NO. ,I2)	DHF	1140
250	FORMAT (20H TIME IN SECONDS)	DHF	1150
260	FORMAT (20H PERCENT DEVIATION)	DHF	1160
	END	DHF	1170

	SUBROUTINE FUNK	FUN	
	COMMON /PULSIN/ ALAMDA(50), DH(200), T(100), NERS, PERDIF(100),	FUN	10
1	CALC(100), W(100), KTRM, ITSP, IPROB, NIN, NOUT	FUN	20
	COMMON /PULSDAT/ NDT, EB(25), HOLD(25,100), NV, NTRACE, MASK(70),	FUN	30
1	X(70), XMAX(70), XMIN(70), DELTAX(70), DELMIN(70), DUMMY, MATRIXA,	FUN	40
2	FRR(70,70), CHISQ, BSAV(100), VEC(70), TRIAL(70), XSAVE(70), CHI	FUN	50
3	70), XCONDD(2,2), OLDDVEC(70), SALVO(70), AOSC(70,15), CHIOSC(15),	FUN	60
4	DIUM(586), NERG, ALF(25,50), ALAM(25,50)	FUN	70
	COMMON /MANI/ TC(100), IIFL(8), KTR(50), NS(10), KKN(25), DIP LIM	FUN	80
	COMMON /ENDF/ MAI, MF, MT, TLIMIT, NPUN	FUN	90
	COMMON /FINRAD/ IRAD, NCONS, RADT(200), DELT(200)	FUN	100
	DIMENSION LXX(20)	FUN	110
	CHISQ=0.	FUN	120
	DO 50 I=1,NERS	FUN	130
	CALC(I)=0.	FUN	140
	DO 40 J=1,NV,2	FUN	150
	IF (IRAD.LE.0) GO TO 10	FUN	160
	COFF=X(J)/DELT(I)/X(J+1)**2	FUN	170
	XP01=1.-EXP(-X(J+1)*RAUT(I))	FUN	180
	XP02=1.-EXP(-X(J+1)*DELT(I))	FUN	190
	XP03=EXP(-X(J+1)*(T(I)-DELT(I)/2.))	FUN	200
	CALC(I)=CALC(I)+COFF*XP01*XP02*XP03	FUN	210
	GO TO 40	FUN	220
10	TEMP=X(J+1)*T(I)	FUN	230
	IF (ABS(TEMP).LE.600.) GO TO 20	FUN	240
	XP0=0.	FUN	250
	GO TO 30	FUN	260
20	XP0=X(J)*EXP(-TEMP)	FUN	270

30	CALC(I)=CALC(I)+XPD	FUN	280
40	CONTINUE	FUN	290
	BSAV(I)=(CALC(I)-DH(I))*W(I)	FUN	300
50	CHISQ=CHISQ+BSAV(I)*BSAV(I)	FUN	310
	DIFMAX=0.	FUN	320
	DO 60 I=1,NERS	FUN	330
	PERDIF(I)=100.*(CALC(I)/DH(I)-1.)	FUN	340
	TSTLIM=ABS(PERDIF(I))	FUN	350
	IF (DIFMAX.LT.TSTLIM) DIFMAX=TSTLIM	FUN	360
60	CONTINUE	FUN	370
	IF (DIFMAX.LE.DIFLIM) CHISQ=1.E-20	FUN	380
	CALL SECOND (IYM)	FUN	390
	IF (ILIMIT.LT.1) TLIMIT=249.5	FUN	400
	IF (IYM.LT.TLIMIT) GO TO 80	FUN	410
	WRITE (NOUT,100)	FUN	420
	WRITE (NOUT,110)	FUN	430
	WRITE (NOUT,120) (X(I),I=1,NV)	FUN	440
	WRITE (NOUT,90) (X(I),I=1,NV)	FUN	450
	WRITE (NOUT,130)	FUN	460
	WRITE (NOUT,140)	FUN	470
	WRITE (NOUT,150) (T(I),DH(I),CALC(I),PERDIF(I),I=1,NERS)	FUN	480
	DO 70 KX=1,NERG	FUN	490
	LXX(KX)=IISP	FUN	500
70	CONTINUE	FUN	510
	CALL PCHOUT (LXX)	FUN	520
80	CONTINUE	FUN	530
	RETURN	FUN	540
C		FUN	550
90	FORMAT (1P6E11.4)	FUN	560
100	FORMAT (1H0,1UX,2HTIME LIMIT WAS REACHED,/)	FUN	570
110	FORMAT (1H ,1UX,30HTHE LAST SET OF PARAMETERS WAS,/)	FUN	580
120	FORMAT (1H ,20X,6E12.4)	FUN	590
130	FORMAT (1H ,1UX,29HCOMPARISON AT EXPIRATION TIME,/)	FUN	600
140	FORMAT (1H0,/,9X,1HT,1UX,2HDH,9X,4HCALC,7X,6HPERDIF,/)	FUN	610
150	FORMAT (1H ,4E12.4)	FUN	620
	END	FUN	630

	SUBROUTINE STEP11	ST-	
	COMMON /PULSIN/ ALAMDA(50), DH(200), T(100), NERS, PERDIF(100),	ST-	10
1	CALC(100), W(100), KTRM, ITSP, IMROB, NIN, NOUT	ST-	20
	COMMON /PULSDAT/ NDT, EB(25), HOLD(25,100), NV, NTRACE, MASK(70),	ST-	30
1	X(70), XMAX(70), XMIN(70), DELTAX(70), DELMIN(70), DUMMY, MATRIA,STE	ST-	40
2	ERR(70,70), CHISQ, BSAV(100), VEC(70), TRIAL(70), XSAVE(70), CHI(STE	ST-	50
3	70), SECOND(2,2), OLQVEC(70), SALVO(70), AOSC(70,15), CHIOSC(15),STE	ST-	60
4	DIM(506), NERG, ALF(25,50), ALAM(25,50)	ST-	70
	COMMON /MANI/ UX(100), IITL(R), KTR(50), NS(10), KKN(25), DIFLIM	ST-	80
	NVMAX=70	ST-	90
	MOSQUE=15	ST-	100
	KW=6	ST-	110
	RATIO=10.0	ST-	120
	COLTN=0.99	ST-	130
	NCOMP=5	ST-	140
	ACK=2.0	ST-	150
	SIGNIF=2.E8	ST-	160
	HUGE=1.E37	ST-	170
	IF (NV) 1310,1310,10	ST-	180
10	NACTIV=0	ST-	190
	DO 90 I=1,NV	ST-	200
	IF (MASK(I)) 90,20,90	ST-	210
20	IF (DELTAX(I)) 60,30,60	ST-	220
30	IF (X(I)) 50,40,50	ST-	230
40	DELTAX(I)=0.01	ST-	240
	GO TO 60	ST-	250
50	DELTAX(I)=0.01*X(I)	ST-	260
60	IF (XMAX(I)-XMIN(I)) 70,70,80	ST-	270
70	XMAX(I)=HUGE	ST-	280
	XMIN(I)=-HUGE	ST-	290

80	NACTIV=NACTIV+1	STE	300
	X(I)=AMAX1(XMIN(I),AMIN1(XMAX(I),X(I)))	STE	310
90	CONTINUE	STE	320
	COMPAK=0.0	STE	330
	IF (NACTIV-1) 100,130,120	STE	340
100	DO 110 J=1,NV	STE	350
110	MASK(J)=0	STE	360
	GO TO 10	STE	370
120	A=NACTIV	STE	380
	SUR=2.0/(A-1.0)	S	390
	P=2.0*(1.0/SQRT(A)/(1.0-0.5*SUR)-1.0)	S	400
	COMPAK=AMIN1(.999,ARS(1.-(1.-COLIN)**SUB)*(1.+P*(1.-COLIN)))	S	410
130	CALL FUNK	STE	420
	NF=1	STE	430
	IF (NV) 1310,1310,140	STE	440
140	DO 150 I=1,NV	STE	450
150	DX(I)=UELTAX(I)	STE	460
	CHIOLD=CHISQ	STE	470
	NOSC=0	STE	480
160	NCIRC=0	STE	490
	NZIP=0	STE	500
C	MAIN DO LOOP FOR CYCLING THROUGH THE VARIABLES.	STE	510
C	FIRST TRIAL STEP WITH EACH VARIABLE IS SEPARATE.	STE	520
170	NACK=0	STE	530
	DO 940 I=1,NV	STE	540
	OLDVEC(I)=VEC(I)	STE	550
	VEC(I)=0.0	STE	560
	TRIAL(I)=0.0	STE	570
	IF (MASK(I)) 180,190,180	STE	580
180	VEC(I)=-0.0	STE	590
	GO TO 940	STE	600
190	NACK=NACK+1	STE	610
	XSAVE(I)=X(I)	STE	620
	IF (SIGNIF*ABS(DX(I))-ABS(X(I))) 340,340,200	STE	630
200	X(I)=XSAVE(I)+DX(I)	STE	640
	NFLAG=1	STE	650
	IF (A(I)-XMIN(I)) 220,210,210	STE	660
210	IF (A(I)-AMAX(I)) 230,230,220	STE	670
220	NFLAG=NFLAG+3	STE	680
	GO TO 250	STE	690
230	CALL FUNK	STE	700
	NF=NF+1	STE	710
	CHIME=CHISQ	STE	720
	IF (CHISQ-CHIOLD) 380,240,250	STE	730
240	NFLAG=NFLAG+1	STE	740
250	X(I)=XSAVE(I)-DX(I)	STE	750
	IF (X(I)-XMIN(I)) 350,260,260	STE	760
260	IF (A(I)-AMAX(I)) 270,270,350	STE	770
270	CALL FUNK	STE	780
	NF=NF+1	STE	790
	IF (CHISQ-CHIOLD) 370,280,290	STE	800
280	NFLAG=NFLAG+1	STE	810
290	IF (NFLAG-3) 300,340,350	STE	820
300	TRIAL(I)=DX(I)*0.5*(CHISQ-CHIME)/(CHIME-2.0*CHIOLD+CHISQ)	STE	830
	IF (TRIAL(I)) 310,350,310	STE	840
310	VEC(I)=TRIAL(I)/ARS(DX(I))	STE	850
	X(I)=XSAVE(I)+TRIAL(I)	STE	860
	CALL FUNK	STE	870
	NF=NF+1	STE	880
	IF (CHISQ-CHIOLD) 320,330,330	STE	890
320	CHIOLD=CHISQ	STE	900
	GO TO 340	STE	910
330	TRIAL(I)=0.0	STE	920
	VEC(I)=0.0	STE	930
	GO TO 350	STE	940
340	VEC(I)=-0.0	STE	950
350	X(I)=XSAVE(I)	STE	960
360	NCIRC=NCIRC+1	STE	970
	IF (NCIRC-NACTIV) 450,950,950	STE	980
370	DX(I)=-DX(I)	STE	990

C	A LOWER VALUE HAS BEEN FOUND. HENCE THIS VARIABLE WILL CHANGE.	STE 1000
380	NCTRC=0	STE 1010
	DFL=DA(I)	STE 1020
390	CHIME=CHIOLD	STE 1030
	CHISQ=CHISQ	STE 1040
	VEC(I)=VEC(I)+DFL/ABS(DX(I))	STE 1050
	TPIAL(I)=TRIAL(I)+DEL	STE 1060
	DEL=ACK*DEL	STE 1070
	XSAVE(I)=X(I)	STE 1080
	X(I)=XSAVE(I)+DEL	STE 1090
	IF (A(I)-AMIN(I)) 440,400,400	STE 1100
400	IF (A(I)-AMAX(I)) 410,410,440	STE 1110
410	CALL FUNK	STE 1120
	NF=NF+1	STE 1130
	IF (CHISQ=CHIOLD) 390,420,420	STE 1140
420	CINDER=0.5/ACK*(ACK**2*CHIME-(ACK**2-1.0)*CHIOLD-CHISQ)/(ACK*CHIME	STE 1150
	1-(ACK+1.0)*CHIOLD+CHISQ)	STE 1160
	X(I)=XSAVE(I)+CINDER*DEL	STE 1170
	CALL FUNK	STE 1180
	NF=NF+1	STE 1190
	IF (CHISQ=CHIOLD) 430,440,440	STE 1200
430	CHIOLD=CHISQ	STE 1210
	TRIAL(I)=TRIAL(I)+CINDER*DEL	STE 1220
	VEC(I)=VEC(I)+CINDER*DEL/ABS(DX(I))	STE 1230
	GO TO 450	STE 1240
440	X(I)=XSAVE(I)	STE 1250
450	IF (NZIP=1) 930,460,460	STE 1260
460	IF (ABS(VEC(I))-ACK) 490,470,470	STE 1270
470	DX(I)=ACK*ABS(DX(I))	STE 1280
	VEC(I)=VEC(I)/ACK	STE 1290
	OLDVEC(I)=OLDVEC(I)/ACK	STE 1300
	DO 480 J=1,MOSQUE	STE 1310
480	ERR(I,J)=ERR(I,J)/ACK	STE 1320
490	SUM0=0.0	STE 1330
	SUMV=0.0	STE 1340
	DO 500 J=1,NV	STE 1350
	SUM0=SUM0+OLDVEC(J)**2	STE 1360
500	SUMV=SUMV+VEC(J)**2	STE 1370
	IF (SUM0*SUMV) 930,930,510	STE 1380
510	SUM0=SQRT(SUM0)	STE 1390
	SUMV=SQRT(SUMV)	STE 1400
	COSINE=0.0	STE 1410
	DO 520 I=1,NV	STE 1420
520	COSINE=COSINE+OLDVEC(J)/SUM0*VEC(J)/SUMV	STE 1430
	IF (NZIP=1) 930,530,540	STE 1440
530	IF (NACK=NACTIV) 930,560,560	STE 1450
540	IF (NACK=NACTIV) 560,550,550	STE 1460
550	IF (NZIP=NCOMP) 560,570,570	STE 1470
560	IF (COSINE=COMPAR) 930,570,570	STE 1480
C	SIMON SAYS, TAKE AS MANY GIANT STEPS AS POSSIBLE...	STE 1490
570	NGTANI=0	STE 1500
	NTRY=0	STE 1510
	NRETRY=0	STE 1520
	KL=1	STE 1530
	NOSC=NOSC+1	STE 1540
	IF (NOSC=MOSQUE) 600,600,580	STE 1550
580	NOSC=MOSQUE	STE 1560
	DO 590 K=1,MOSQUE	STE 1570
	CHIOSC(K-1)=CHIOSC(K)	STE 1580
	DO 590 J=1,NV	STE 1590
	XOSC(J,K-1)=XOSC(J,K)	STE 1600
590	ERR(J,K-1)=ERR(J,K)	STE 1610
600	DO 610 J=1,NV	STE 1620
	XOSC(J,NOSC)=X(J)	STE 1630
610	ERR(J,NOSC)=VEC(J)/SUMV	STE 1640
	CHIOSC(NOSC)=CHIOLD	STE 1650
	IF (NOSC=5) 670,620,620	STE 1660
C	SEARCH FOR A PREVIOUS SUCCESSFUL GIANT STEP IN A DIRECTION MORE	STE 1670
C	NEARLY PARALLEL TO THE DIRECTION OF THE PROPOSED STEP THAN WAS THE	STE 1680

C	IMMEDIATELY PREVIOUS ONE.	STE 1670
620	COXCUM=0.0	STE 1700
	DO 630 J=1,NV	STE 1710
630	COXCUM=COXCUM+ERR(J,NOSC)*ERR(J,NUSC-1)	STE 1720
	NAH=NUSC-2	STE 1730
640	NTRY=0	STE 1740
	DO 650 K=KL,NAH	STE 1750
	NRETRY=NAH-K	STE 1760
	COSINE=0.0	STE 1770
	DO 650 J=1,NV	STE 1780
650	COSINE=COSINE+ERR(J,NOSC)*ERR(J,K)	STE 1790
	IF (COSINE-COXCUM) 660,660,680	STE 1800
660	CONTINUE	STE 1810
670	CHIRAK=CHI(I)	STE 1820
	GO TO 700	STE 1830
680	NTRY=1	STE 1840
	KL=K+1	STE 1850
	DO 690 J=1,NV	STE 1860
	SALVU(J)=TRIAL(J)	STE 1870
690	TRIAL(J)=(X(J)-XUSC(J,K))/ACK	STE 1880
	CHIRAK=CHIOLD+(CHIOSC(K)-CHIOLD)/ACK	STE 1890
700	DO 720 J=1,NV	STE 1900
	XSAVE(J)=X(J)	STE 1910
	TRIAL(J)=ACK*TRIAL(J)	STE 1920
	IF (MASK(J)) 720,720,720	STE 1930
710	X(J)=AMAX1(AMIN1(X(J)+TRIAL(J),XMAX(J)),XMIN(J))	STE 1940
720	CONTINUE	STE 1950
	CALL FUNK	STE 1960
	NF=NF+1	STE 1970
	IF (CHISQ=CHIOLD) 730,740,740	STE 1980
730	CHIRAK=CHIOLD	STE 1990
	CHIOLD=CHISQ	STE 2000
	NGIANI=NGIANI+1	STE 2010
	GO TO 700	STE 2020
740	IF (NRETRY) 760,760,750	STE 2030
750	IF (NGIANI) 810,810,760	STE 2040
760	CINDER=0.5/ACK*(ACK**2*CHIRAK-(ACK**2-1.0)*CHIOLD-CHISQ)/(ACK	STE 2050
	1*CHIRAK-(ACK+1.0)*CHIOLD+CHISQ)	STE 2060
	DO 780 J=1,NV	STE 2070
	IF (MASK(J)) 780,770,780	STE 2080
770	X(J)=AMAX1(AMIN1(XSAVE(J)+CINDER*TRIAL(J),XMAX(J)),XMIN(J))	STE 2090
780	CONTINUE	STE 2100
	CALL FUNK	STE 2110
	NF=NF+1	STE 2120
	IF (CHISQ=CHIOLD) 890,790,790	STE 2130
790	IF (NGIANI) 830,800,830	STE 2140
800	IF (NTRY) 810,830,810	STE 2150
810	DO 820 J=1,NV	STE 2160
	TRIAL(J)=SALVU(J)	STE 2170
820	X(J)=XSAVE(J)	STE 2180
	GO TO 850	STE 2190
830	DO 840 J=1,NV	STE 2200
	TRIAL(J)=TRIAL(J)/ACK	STE 2210
840	X(J)=XSAVE(J)	STE 2220
850	IF (NGIANI) 860,860,900	STE 2230
860	IF (NRETRY) 870,870,860	STE 2240
870	IF (NTRY) 880,920,880	STE 2250
880	NTRY=0	STE 2260
	GO TO 670	STE 2270
890	CHIOLD=CHISQ	STE 2280
900	IF (NTRY) 910,160,910	STE 2290
910	NOSC=0	STE 2300
	GO TO 160	STE 2310
920	NOSC=MAX0(NOSC-1,0)	STE 2320
930	CHI(I)=CHIOLD	STE 2330
940	CONTINUE	STE 2340
C	ANOTHER CYCLE THROUGH THE VARIABLES HAS BEEN COMPLETED.	STE 2350
C	PRINT ANOTHER LINE OF TRACES.	STE 2360
	NZIP=NZIP+1	STE 2370

	GO TO 170	STE 2380
C	A MINIMUM HAS BEEN FOUND. PRINT THE REMAINING TRACES.	STE 2390
950	NOSC=0	STE 2400
	DO 900 I=1,NV	STE 2410
C	STEP 11 4.5 ... STEPIT WITH OSCILLATION SEARCH, MATRIX INVERSION,	STE 2420
C	AND AUTOMATIC STEP SIZE ADJUSTMENT. CHANDLER 2/	STE 2430
	IF (AMAX1(VEC(I),SIGN(1.0,VEC(I)))) 970,960,970	STE 2440
960	CONTINUE	STE 2450
	GO TO 1010	STE 2460
970	NGATE=1	STE 2470
	DO 1000 I=1,NV	STE 2480
	IF (MASK(I)) 1000,980,1000	STE 2490
980	IF (ABS(DX(I))-ABS(DELMIN(I))) 1000,990,990	STE 2500
990	NGATE=0	STE 2510
1000	DX(I)=DX(I)/RATIO	STE 2520
	IF (NGATE) 160,160,1010	STE 2530
1010	CHISQ=CHIOLD	STE 2540
	IF (ABS(MATRIX-100)-50) 1020,1020,1310	STE 2550
1020	IF (INACTIV-NV) 1310,1030,1310	STE 2560
C	COMPUTE THE STANDARD ERRORS AND THE CORRELATIONS.	STE 2570
1030	FAC=RATIO**2(MATRIX-100)	STE 2580
	ESUM=0.0	STE 2590
	DO 1040 I=1,NV	STE 2600
	IF (DELMIN(I)) 1040,1050,1040	STE 2610
1040	DX(I)=ABS(FAC*DELMIN(I))	STE 2620
	GO TO 1060	STE 2630
1050	DX(I)=ABS(FAC*DX(I))	STE 2640
1060	IF (DX(I)) 1310,1310,1070	STE 2650
1070	XSAVE(I)=X(I)	STE 2660
	DO 1080 J=1,2	STE 2670
	X(I)=XSAVE(I)*DX(I)	STE 2680
	CALL FUNK	STE 2690
	NF=Nf+1	STE 2700
	SECOND(1,J)=CHISQ	STE 2710
1080	DX(I)=-DX(I)	STE 2720
	ERR(1,1)=(SECOND(1,1)-2.0*CHIOLD+SECOND(1,2))/DX(I)**2	STE 2730
1090	ESUM=ESUM+ABS(ERR(1,1))	STE 2740
	DO 1120 I=2,NV	STE 2750
	IM=I-1	STE 2760
	DO 1120 J=1,IM	STE 2770
	DO 1110 K=1,2	STE 2780
	X(I)=XSAVE(I)*DX(I)	STE 2790
	DO 1100 L=1,2	STE 2800
	X(J)=XSAVE(J)*DX(J)	STE 2810
	CALL FUNK	STE 2820
	NF=Nf+1	STE 2830
	SECOND(K,L)=CHISQ	STE 2840
	X(J)=XSAVE(J)	STE 2850
1100	DX(J)=-DX(J)	STE 2860
	X(I)=XSAVE(I)	STE 2870
1110	DX(I)=-DX(I)	STE 2880
	ERR(1,J)=0.25*(SECOND(1,1)-SECOND(1,2)-SECOND(2,1)+SECOND(2,2))	STE 2890
	1 /ABS(DX(I)*DX(J))	STE 2900
	ESUM=ESUM+ABS(ERR(1,J))	STE 2910
1120	ERR(J,1)=ERR(1,J)	STE 2920
	BRAAAK=ABS(ESUM)/FLOAT(NV)**2	STE 2930
	NGRATE=0	STE 2940
	DO 1140 I=1,NV	STE 2950
	DO 1140 J=1,NV	STE 2960
	IF (ERR(I,J)) 1140,1130,1140	STE 2970
1130	NGRATE=1	STE 2980
1140	ERR(1,J)=ERR(1,J)/BRAAAK	STE 2990
	DET=1.0	STE 3000
	DO 1150 J=1,NV	STE 3010
1150	SALVU(J)=1.0	STE 3020
	DO 1300 I=1,NV	STE 3030
	BIGAUJ=0.0	STE 3040

	DO 1180 J=1,NV	STE 3050
	IF (SALVO(J)) 1160,1180,1160	STE 3060
1160	IF (ABS(ERR(J,J))-RIGAUJ) 1180,1180,1170	STE 3070
1170	RIGAUJ=ABS(ERR(J,J))	STE 3080
	K=J	STE 3090
1180	CONTINUE	STE 3100
	IF (RIGAUJ) 1200,1190,1200	STE 3110
1190	DET=0.0	STE 3120
	GO TO 1310	STE 3130
1200	SALVO(K)=0.0	STE 3140
	DET=DET+ERR(K,K)	STE 3150
	TRIAL(K)=1.0/ERR(K,K)	STE 3160
	ERR(N,K)=0.0	STE 3170
	XSAVE(K)=1.0	STE 3180
	M=K+1	STE 3190
	IF (M) 1240,1240,1210	STE 3200
1210	DO 1230 J=1,M	STE 3210
	XSAVE(J)=ERR(K,J)	STE 3220
	TRIAL(J)=ERR(K,J)*TRIAL(K)	STE 3230
	IF (SALVO(J)) 1190,1230,1220	STE 3240
1220	TRIAL(J)=-TRIAL(J)	STE 3250
1230	ERR(N,J)=0.0	STE 3260
1240	M=K+1	STE 3270
	IF (M-NV) 1250,1250,1290	STE 3280
1250	DO 1280 J=M,NV	STE 3290
	XSAVE(J)=ERR(J,K)	STE 3300
	IF (SALVO(J)) 1190,1260,1270	STE 3310
1260	XSAVE(J)=-XSAVE(J)	STE 3320
1270	TRIAL(J)=-ERR(J,K)*TRIAL(K)	STE 3330
1280	ERR(J,K)=0.0	STE 3340
1290	DO 1300 J=1,NV	STE 3350
	DO 1300 K=J,NV	STE 3360
1300	ERR(N,J)=ERR(K,J)+XSAVE(J)*TRIAL(K)	STE 3370
1310	CALL FUNK	STE 3380
	WRITE (NOUT,1320)	STE 3390
	WRITE (NOUT,1330) (X(I),I=1,NV)	STE 3400
	IF (CHISQ.GT.1.E-20) WRITE (NOUT,1340) CHISQ	STE 3410
	IF (CHISQ.LE.1.E-20) WRITE (NOUT,1350) DIFLIM	STE 3420
	RETURN	STE 3430
C		STE 3440
1320	FORMAT (//1X,22H FINAL VALUES OF X(I))	STE 3450
1330	FORMAT (1X,10H X = ,10E12.4/(10X,10E12.4))	STE 3460
1340	FORMAT (///1X,23HFINAL VALUE OF CHISQ = ,E15.8///)	STE 3470
1350	FORMAT (1H0,1X,10H DIFLIM = E15.8)	STE 3480
	END	STE 3490

	SUBROUTINE FINECHK (KL)	FIN
C		FIN 10
C	ROUTINE CALCULATES INTERMEDIATE POINTS AND CHECKS FOR	FIN 20
C	REASONABLENESS.	FIN 30
C		FIN 40
	COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPRUH,	FIN 50
1	NIN, NOUT	FIN 60
	COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(25,	FIN 70
1	5,50)	FIN 80
	COMMON /PULSCAL/ A(50,50), B(50,1)	FIN 90
	COMMON /MANI/ TC(100), TITL(8), KTR(50), NS(10), KKN(25), DIFLIM	FIN 100
	COMMON /FINRAD/ IRAD, NCOHS, RADT(200), DELT(200)	FIN 110
	DIMENSION EXP(700), TP(700), TI(10), XL(10), YL(10), TPF(700)	FIN 120
	K=KL	FIN 130
	ENCODE (27,170,TI(1)) K	FIN 140
	ENCODE (20,190,XL)	FIN 150
	ENCODE (10,200,YL)	FIN 160
	XL(2)=10H SECONDS.	FIN 170
	FXMIN=FX(1)	FIN 180
	DO 10 I=1,ITSP	FIN 190
	IF (FX(I).LT.FXMIN) FXMIN=FX(I)	FIN 200

10	CONTINUE	FIN	210
	DELF=0.	FIN	220
	L=0	FIN	230
	TP(1)=T(1)	FIN	240
	DEC=1(1)	FIN	250
20	CONTINUE	FIN	260
	L=L+1	FIN	270
	DELF=DELF+1.0	FIN	280
	TP(L)=DELF*DEC	FIN	290
	IF (TP(L).GE.T(TSP)) GO TO 30	FIN	300
	IF ((TP(L)/DEC).GE.10.0) DELF=1.0	FIN	310
	IF ((TP(L)/DEC).GE.10.0) DEC=DEC*10.0	FIN	320
	GO TO 20	FIN	330
30	CONTINUE	FIN	340
	NK=L	FIN	350
C		FIN	360
C	THIS LOOP IS TO INCREASE TIME MESH BY FACTOR OF FIVE.	FIN	370
		FIN	380
	NPF=1	FIN	390
	TP(NPF)=TP(1)	FIN	400
	DO 50 N=2,NK	FIN	410
	IF (NPF.GT.700) GO TO 50	FIN	420
	DELF=(TP(N)-TP(N-1))/5.0	FIN	430
	DO 40 NJ=1,5	FIN	440
	NPF=NPF+1	FIN	450
	TP(NPF)=TP(N)+DELF	FIN	460
40	CONTINUE	FIN	470
50	CONTINUE	FIN	480
	IF (NPF.GT.700) WRITE (NOUT,140) TP(NPF)	FIN	490
	NK=NPF	FIN	500
	DO 60 N=1,NK	FIN	510
	TP(N)=TP(N)	FIN	520
60	CONTINUE	FIN	530
	WRITE (NOUT,180) K	FIN	540
	DO 90 N=1,NK	FIN	550
	FXP(N)=0.	FIN	560
	KTRM=ALR(K)	FIN	570
	DO 80 J=1,KTRM	FIN	580
	IF (HAD.LE.0) GO TO 70	FIN	590
	XPO=ALF(K,J)*EXP(-ALAM(K,J)*TP(N))	FIN	600
	COFF=ALF(K,J)/DELT(N)/ALAM(K,J)**2	FIN	610
	XPO1=1.-EXP(-ALAM(K,J)*HAD(N))	FIN	620
	XPO2=1.-EXP(-ALAM(K,J)*DELT(N))	FIN	630
	XPO3=EXP(-ALAM(K,J)*(T(N)-DELT(N)/2.))	FIN	640
	FXP(N)=FXP(N)+COFF*XPO1*XPO2*XPO3	FIN	650
	GO TO 80	FIN	660
70	TEMP=ALAM(K,J)*TP(N)	FIN	670
	IF (ABS(TEMP).GT.600) GO TO 80	FIN	680
	FXP(N)=FXP(N)*ALF(K,J)*EXP(-TEMP)	FIN	690
80	CONTINUE	FIN	700
90	CONTINUE	FIN	710
	WRITE (NOUT,210) (N,TP(N)+FXP(N),N=1,NK)	FIN	720
C		FIN	730
C	TEST FOR POINT DEVIATION AND SLOPE REVERSAL.	FIN	740
C		FIN	750
	NFLG=0	FIN	760
	LFLG=0	FIN	770
	NK1=NK-1	FIN	780
	WRITE (NOUT,150) K	FIN	790
	DO 110 N=2,NK1	FIN	800
	IF (FAP(N).GT.0.) GO TO 100	FIN	810
	NFLG=NFLG+1	FIN	820
	GO TO 110	FIN	830
100	CONTINUE	FIN	840
	IF (FAP(N-1).LE.0.0.OR.FXP(N+1).LE.0.0) GO TO 110	FIN	850
	AVLG=(ALOG(FXP(N-1))+ALOG(FXP(N+1)))/2.0	FIN	860
	FAVG=EXP(AVLG)	FIN	870
	FDIF=ABS((FXP(N)-FAVG)/FXP(N))	FIN	880

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      IF (PDIIF.GE.1.0) LFLG=LFLG+1          FIN 890
      IF (PDIIF.GE.1.0) WRITE (NOUT,230) N      FIN 900
      IF (PDIIF.GE.0.1) WRITE (NOUT,220) N,FDIF FIN 910
      IF (PAP(N).GT.FXP(N-1)) WRITE (NOUT,160) N FIN 920
110  CONTINUE                                  FIN 930
      IF (PAP(1).LE.0.) NFLG=NFLG+1           FIN 940
      IF (PAP(NK).LE.0.) NFLG=NFLG+1          FIN 950
      IF (NFLG.EQ.0) GO TO 120                 FIN 960
      WRITE (NOUT,240) NFLG                    FIN 970
      RETURN                                    FIN 980
120  CONTINUE                                  FIN 990
      IF (LFLG.EQ.0) GO TO 130                 FIN 1000
      WRITE (NOUT,250) LFLG                    FIN 1010
130  CONTINUE                                  FIN 1020
      NK=1-NK                                  FIN 1030
C     CALL PLOTM (TP,FXP,NK,-1,0,0,0,0,1,0,1,0,T1,30,XL,20,YL,10) FIN 1040
CC    CALL PLOTM (T,FX,-ITSP,-1,-1,-47,0,1,0,1,0,T1,30,XL,20,YL,10) FIN 1050
      RETURN                                    FIN 1060
C                                              FIN 1070
140  FORMAT (1H0,18H PLOTS CUT AT TP =1PE12.5,28H SEC AS POINT LIMIT REFIN 1080
      1ACHEU.)                                FIN 1090
150  FORMAT (33H0 POINT DEVIATION CHECK FOR GROUP,13//51H NOTE = ONLY VFIN 1100
      1ALUES GREATER THAN TEN PERCENT FOLLOW)  FIN 1110
160  FORMAT (30H0 FUNCTION RISING AT POINT NO.,13) FIN 1120
170  FORMAT (25H0 FINE CHECK FOR GROUP NO.,12) FIN 1130
180  FORMAT (26H FINE CHECK FOR GROUP NO.,12) FIN 1140
190  FORMAT (20H TIME IN SECONDS )            FIN 1150
200  FORMAT (10H FX(I) )                      FIN 1160
210  FORMAT (4(2X,14,2X,F10.3,2X,F10.3))      FIN 1170
220  FORMAT (19H0 AT POINT NUMBER ,13,8H FDIF = ,F6.3) FIN 1180
230  FORMAT (22H0 CHECK POINT NUMBER ,13)     FIN 1190
240  FORMAT (14H0 THERE ARE ,13,30H NEW FXP VALUES. FIT NO GOOD.) FIN 1200
250  FORMAT (21H0 FIT RATHER POOR AT ,13,21H POINTS. CHECK PLOT.) FIN 1210
      END                                       FIN 1220

      SUBROUTINE PULSFIT (KKF)                  PUL
C                                              PUL 10
C     THIS ROUTINE PROVIDES A SINGLE PARAMETER FIT FOR A COMBINATION PUL 20
C     OF LINEAR FUNCTIONS OF THE FORM --      PUL 30
C                                              PUL 40
C      $FX(I) = \sum_{K=1}^{KTRM} \alpha(K) \exp(-\lambda(K) \cdot T(I))$ , SUM OVER K=1,KTRM, PUL 50
C     THE NUMBER OF TERMS USED TO REPRESENT FX. PUL 60
C                                              PUL 70
C     GIVEN A SET OF ALAMDAS, (SEE COMMENTS BELOW), THIS ROUTINE SOLVES PUL 80
C     FOR ALPHAS. PUL 90
C     IT IS ADVISABLE TO MAKE A SINGLE PARAMETER FIT WITH PULSFIT BEFORE PUL 100
C     MAKING A TWO PARAMETER FIT WITH SIEFIT. PUL 110
C                                              PUL 120
C     COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPRUB, PUL 130
C     1 NIN, NOUT PUL 140
C     COMMON /PULSCAL/ A(50,50), R(50,1) PUL 150
C     COMMON /PULSOUT/ ALPHA(50), FXC(100), PCT(100) PUL 160
C     COMMON /MANI/ W(100), IITL(R), KTR(50), NS(10), KKN(25), DIP LIM PUL 170
C     COMMON /FINHAU/ IRAD, NCONS, RADT(200), DELT(200) PUL 180
C     DIMENSION KCAL(71) PUL 190
C     ITS=1 PUL 200
C     IPR0=KKF PUL 210
C     READ (NIN,230) LWT,NOK,KTRM,IPRT PUL 220
C                                              PUL 230
C     LWT=*1 FOR DESIRED,=0,W=1,=1,W=1/FX,=2,W=1/FX**2,=3,W=1/FX**1.5. PUL 240
C     NOK=FLAG FOR ALAMDA PARAMETER SELECTION PUL 250
C     KTRM=NO. OF ALAMDAS USED IN FIT. PUL 260
C     NOK=0,KTRM=KTRM,READ (ALAMDA(K),K=1,KTRM), THIS OPTION PUL 270
C     USED FOR INITIAL INPUT ,FOR EXAMPLE,TWO ALAMDAS PER TIME PUL 280
C     DECADE -- 1.0,0.5,0.1,0.05,0.01,0.005,ETC. PUL 290
C     NOK=1,KTRM=1,ALAMDAS CALCULATED FROM SLOPES AT EVERY PAIR PUL 300
C     OF POINTS. PUL 310

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C      NOK=1,KTRM=KTRM,READ IN (KCAL(L),L=2,KTRM) (1216),WHICH SELECT SPUL 320
C      THOSE POINTS TO BE USED IN THE CALCULATION OF THE ALAMDAS. PUL 330
C      NOTE -- KCAL ALSO USED TO ELIMINATE UNWANTED PARAMETERS IN PUL 340
C      SUBSEQUENT RUNS. SEE BELOW. PUL 350
C      NOK=2,KTRM=1,READ KTRM(55X,111) AND H(K,1),ALAMDA(K),K=1,KTRM PUL 360
C      (B(K,1)=ALPHA(K)) (6E11.4) FROM PREVIOUS PROBLEM. THIS OPTION PUL 370
C      IS USED WHEN FIT FOR THIS GROUP IS NOW BEING DONE IN STEP11. PUL 380
C      IPRT=1,PRINT A-MATRIX,=0,NO PRINT. PUL 390
C      NOTE --- BYPASS IWANT READ BELOW IF NOK=2. PUL 400
C
C      IF (NOK.NE.2) GO TO 10 PUL 410
C      READ (NIN,250) KTRM PUL 420
C      READ (NIN,260) (B(K,1),ALAMDA(K),K=1,KTRM) PUL 430
C      RETURN PUL 440
10  CONTINUE PUL 450
C      IF (NOK.LE.0) GO TO 60 PUL 460
C      KTRM IS NO OF INPUT ALAMDAS,ITSP IS NO OF TIME STEPS USED IN FIT. PUL 470
C      PUL 480
C      LOOP TO CALCULATE ALAMDA FOR SELECTED STEPS. PUL 490
C      PUL 500
C      NOK=ITSP PUL 510
C      DO 20 L=1,NOK PUL 520
C      KCAL(L)=L PUL 530
20  CONTINUE PUL 540
C      IF (KTRM.EQ.1) GO TO 30 PUL 550
C      KCAL(1)=1 PUL 560
C      READ (NIN,230) (KCAL(L),L=2,KTRM) PUL 570
30  CONTINUE PUL 580
C      IF (L.LE.50) GO TO 40 PUL 590
C      WRITE (NOUT,220) L PUL 600
C      STOP PUL 610
40  CONTINUE PUL 620
C      IF (KTRM.GT.2) KTRM=KTRM-1 PUL 630
C      IF (KTRM.EQ.1) KTRM=NOK-1 PUL 640
C      ALAMDA(1)=1/T(1)*1.5 PUL 650
C      DO 50 K=1,KTRM PUL 660
C      K1=KCAL(K) PUL 670
C      K2=KCAL(K+1) PUL 680
C      TST=(1/(K2)-1/(K1)) PUL 690
C      IF (TST.EQ.0.0) GO TO 50 PUL 700
C      ALAMDA(K+1)=ALOG(FX(K1)/FX(K2))/(1/(K2)-1/(K1)) PUL 710
C      IF (ALAMDA(K+1).LE.0.) ALAMDA(K+1)=ALAMDA(K)/2. PUL 720
50  CONTINUE PUL 730
C      KTRM=KTRM+1 PUL 740
C      IF (ALAMDA(1).LE.ALAMDA(2)) ALAMDA(1)=ALAMDA(2)*2. PUL 750
C      IF (ALAMDA(1).GT.(ALAMDA(2)*2.)) ALAMDA(1)=ALAMDA(2)*2. PUL 760
C      IF (ALAMDA(KTRM).GT.(1./T(ITSP))) ALAMDA(KTRM)=1./T(ITSP) PUL 770
C      GO TO 30 PUL 780
60  CONTINUE PUL 790
C      READ (NIN,240) (ALAMDA(K),K=1,KTRM) PUL 800
70  CONTINUE PUL 810
C      PUL 820
C      PUL 830
C      SELECT ALAMDAS WANTED,E.G. LEAVE OUT ONE OF A DUPLICATED PAIR. PUL 840
C      IWANT=NO. OF ALAMDAS KEPT. SET=0 IF ALL ARE KEPT. PUL 850
C      KCAL(L)=ALAMDAS WANTED. NOTE - IWANT USUALLY SET TO ZERO ON PUL 860
C      INITIAL RUNS,AND KCAL(L) NOT READ. PUL 870
C      ALSO NOTE -- THIS INPUT NEEDED FOR EACH SEGMENT. PUL 880
C      PUL 890
C      READ (NIN,230) IWANT,(KCAL(L),L=1,IWANT) PUL 900
C      IF (IWANT.LE.0) GO TO 100 PUL 910
C      DO 80 L=1,IWANT PUL 920
C      LL=KCAL(L) PUL 930
C      ALPHA(L)=ALAMDA(LL) PUL 940
80  CONTINUE PUL 950
C      KTRM=IWANT PUL 960
C      DO 90 K=1,KTRM PUL 970
C      ALAMDA(K)=ALPHA(K) PUL 980
90  CONTINUE PUL 990
100 CONTINUE PUL 1000

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C		PUL 1010
C	WRITE OUT INPUT FOR DEBUG	PUL 1020
	WRITE (NOUT,270) (K,ALAMDA(K),KCAL(K),KCAL(K+1),K=1,KTRM)	PUL 1030
	WRITE (NOUT,280) (I,T(I),FX(I),I=1,ITSP)	PUL 1040
	DO 110 I=1,ITSP	PUL 1050
	W(I)=1./FX(I)**2	PUL 1060
	IF (LWT.EQ.3) W(I)=1./FX(I)**1.5	PUL 1070
	IF (LWT.EQ.1) W(I)=1./FX(I)	PUL 1080
	IF (LWT.LE.0) W(I)=1.	PUL 1090
110	CONTINUE	PUL 1100
	WRITE (NOUT,290) LWT	PUL 1110
C		PUL 1120
C	CALCULATE B MATRIX	PUL 1130
C		PUL 1140
	DO 140 K=1,KTRM	PUL 1150
	B(K,1)=0.	PUL 1160
	DO 130 I=1,ITSP	PUL 1170
	IF (IKAU.LE.0) GO TO 120	PUL 1180
	XP1=EXP(-ALAMDA(K)*RAUT(I))	PUL 1190
	XP2=EXP(-ALAMDA(K)*DELT(I))	PUL 1200
	XP3=EXP(-ALAMDA(K)*(T(I)-DELT(I)/2.))	PUL 1210
	B(K,1)=B(K,1)+FX(I)*1./DELT(I)/ALAMDA(K)**2*(1.-XP1)*(1.-XP2)*XP3	PUL 1220
	1 *W(I)	PUL 1230
	GO TO 130	PUL 1240
120	CONTINUE	PUL 1250
	B(K,1)=B(K,1)+FX(I)*EXP(-ALAMDA(K)*T(I))*W(I)	PUL 1260
130	CONTINUE	PUL 1270
140	CONTINUE	PUL 1280
C		PUL 1290
C	CALCULATE A MATRIX	PUL 1300
C		PUL 1310
	DO 150 I=1,KTRM	PUL 1320
	DO 150 J=1,KTRM	PUL 1330
	A(I,J)=0.	PUL 1340
150	CONTINUE	PUL 1350
	DO 190 K=1,KTRM	PUL 1360
	ALAM=ALAMDA(K)	PUL 1370
	DO 180 L=1,KTRM	PUL 1380
	DO 170 I=1,ITSP	PUL 1390
	IF (IKAU.LE.0) GO TO 160	PUL 1400
	XP01=1.-EXP(-ALAMDA(K)*RAUT(I))	PUL 1410
	XP02=1.-EXP(-ALAMDA(L)*RAUT(I))	PUL 1420
	XP03=1.-EXP(-ALAMDA(K)*DELT(I))	PUL 1430
	XP04=1.-EXP(-ALAMDA(L)*DELT(I))	PUL 1440
	XP05=EXP(-ALAMDA(K)*(T(I)-DELT(I)/2.))	PUL 1450
	XP06=EXP(-ALAMDA(L)*(T(I)-DELT(I)/2.))	PUL 1460
	COFF=1./DELT(I)/ALAMDA(K)**2.	PUL 1470
	COFT=1./DELT(I)/ALAMDA(L)**2	PUL 1480
	A(K,L)=A(K,L)*COFF*COFT*XP01*XP02*XP03*XP04*XP05*XP06*W(I)	PUL 1490
	GO TO 170	PUL 1500
160	CONTINUE	PUL 1510
	A(K,L)=EXP(-(ALAM+ALAMDA(L))*T(I))*W(I)+A(K,L)	PUL 1520
170	CONTINUE	PUL 1530
180	CONTINUE	PUL 1540
190	CONTINUE	PUL 1550
C		PUL 1560
C	PRINT A MATRIX	PUL 1570
C		PUL 1580
	IF (IPRT.LT.1) GO TO 210	PUL 1590
	WRITE (NOUT,300) IPROT	PUL 1600
	DO 200 K=1,KTRM	PUL 1610
	WRITE (NOUT,310) (A(K,L),L=1,KTRM)	PUL 1620
200	CONTINUE	PUL 1630
210	CONTINUE	PUL 1640
	WRITE (NOUT,320) IPROT	PUL 1650
	WRITE (NOUT,310) (A(K,1),K=1,KTRM)	PUL 1660
C	SUBROUTINE LSS SOLVES THE SET OF LINEAR EQUATIONS AX=B	PUL 1670
	CALL LSS (KTRM,1,50,A,B,D,DET)	PUL 1680
	WRITE (NOUT,320) IPROT	PUL 1690

	WRITE (NOUT,310) (R(K,1),K=1,KTRM)	PUL 1700
	L=0	PUL 1710
	CALL SEEFIT (IPRO,L)	PUL 1720
	RETURN	PUL 1730
C		PUL 1740
	220 FORMAT (1H1,45H ONLY FIFTY TERMS ALLOWED IN FIT. YOU WANT 13)	PUL 1750
	230 FORMAT (12I6)	PUL 1760
	240 FORMAT (3(11X,E11.4))	PUL 1770
	250 FORMAT (50X,I11)	PUL 1780
	260 FORMAT (1P4E11.4)	PUL 1790
	270 FORMAT (3H K=,I3,11H ALAMDA(K)=,1PE12.5,9H KCAL(K)=,I3,11H KCAL(K=	PUL 1800
	11)=,I3)	PUL 1810
	280 FORMAT (4H I=,I3,6H T(I)=,1PE12.5,7H FX(I)=,1PE12.5)	PUL 1820
	290 FORMAT (1H0,6H LWT=,I3)	PUL 1830
	300 FORMAT (16H0 A-MATRIX FOR ,I6)	PUL 1840
	310 FORMAT (2X,10E12.3)	PUL 1850
	320 FORMAT (15H0 B-MATRIX FOR ,I6)	PUL 1860
	END	PUL 1870
	SUBROUTINE SEEFIT (IP,LP)	SEE
C		SEE 10
C	ROUTINE COMPARES FIT WITH ORIGINAL VALUES.	SEE 20
C		SEE 30
	COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPR0B,	SEE 40
	1 NIN, NOUI	SEE 50
	COMMON /PULSCAL/ A(50,50), R(50,1)	SEE 60
	COMMON /PULSOUT/ ALPHA(50), FXC(100), PCTDIF(100)	SEE 70
	COMMON /FINRAD/ IRAD, NCORR, RAUT(200), DELT(200)	SEE 80
	DIMENSION TI(10), XL(10), YL(10)	SEE 90
	DO 30 I=1,ITSP	SEE 100
	PCTDIF(I)=0.	SEE 110
	FXC(I)=0.	SEE 120
	DO 20 K=1,KTRM	SEE 130
	IF ((-ALAMDA(K)*T(I)).GT.300.) ALAMDA(K)=-300.0/T(I)	SEE 140
	IF (IRAD.LE.0) GO TO 10	SEE 150
	COFF=B(K)/DELT(I)/ALAMDA(K)**2	SEE 160
	XP01=1.-EXP(-ALAMDA(K)*RAUT(I))	SEE 170
	XP02=1.-EXP(-ALAMDA(K)*DELT(I))	SEE 180
	XP03=EXP(-ALAMDA(K)*(T(I)-DELT(I)/2.))	SEE 190
	FXC(I)=FXC(I)+COFF*XP01*XP02*XP03	SEE 200
	GO TO 20	SEE 210
	10 CONTINUE	SEE 220
	FXC(I)=FXC(I)+B(K)*EXP(-ALAMDA(K)*T(I))	SEE 230
	ALPHA(K)=B(K)*EXP(-ALAMDA(K)*T(I))	SEE 240
	20 CONTINUE	SEE 250
	PCTDIF(I)=(FX(I)-FXC(I))/FX(I)*100.	SEE 260
	IF (LP.LE.0) GO TO 30	SEE 270
	WRITE (NOUT,90) I,T(I)	SEE 280
	WRITE (NOUT,100) (K,ALPHA(K),K=1,KTRM)	SEE 290
	30 CONTINUE	SEE 300
	IPRO=1P	SEE 310
	WRITE (NOUT,110) IPR0	SEE 320
	WRITE (NOUT,120) (I,T(I),FX(I),FXC(I),PCTDIF(I),I=1,ITSP)	SEE 330
	RMS=0.	SEE 340
	DO 40 I=1,ITSP	SEE 350
	RMS=RMS+PCTDIF(I)**2	SEE 360
	40 CONTINUE	SEE 370
	RMS=RMS**0.5	SEE 380
	WRITE (NOUT,130) RMS	SEE 390
	AR1=0.	SEE 400
	AR2=0.	SEE 410
	DO 50 I=2,ITSP	SEE 420
	AR1=AR1+(FX(I)+FX(I-1))/2.0*(T(I)-T(I-1))	SEE 430
	AR2=AR2+(FXC(I)+FXC(I-1))/2.0*(T(I)-T(I-1))	SEE 440
	50 CONTINUE	SEE 450
	ARDIF=(AR1-AR2)/AR1*100.	SEE 460
	WRITE (NOUT,140) AR1,AR2,ARDIF	SEE 470

	FXMIN=FX(1)	SEE	480
	DO 60 I=1,ITSP	SEE	490
	IF (FA(I).LE.0.0) FX(I)=FX(I-1)/10.	SEE	500
	IF (FA(I).LT.FXMIN) FXMIN=FX(I)	SEE	510
60	CONTINUE	SEE	520
	DO 70 I=1,ITSP	SEE	530
	IF (FA(I).LT.FXMIN) FX(I)=FXMIN	SEE	540
70	CONTINUE	SEE	550
	ENCODE (40,150,TI(1))	SEE	560
	ENCODE (10,160,XL(1))	SEE	570
	ENCODE (10,170,YL(1))	SEE	580
	ITS=1ITSP	SEE	590
	IS=1	SEE	600
	IF ((FX(1)/FX(ITSP-1)).LT.100.) GO TO 80	SEE	610
	ITS=-1ITSP	SEE	620
	IS=-1	SEE	630
80	CONTINUE	SEE	640
C	CALL PLOTM (T,FX,ITS,IS,0,0,0,1,1,1,40,XL,10,YL,10)	SEE	650
C	CALL PLOTM (T,FXC,ITS,IS,-1,-47.0,1,1,1,40,XL,10,YL,10)	SEE	660
	RETURN	SEE	670
C		SEE	680
90	FORMAT (18H TERMS FOR STEP ,I3,8H T(I) = ,1PE12.5)	SEE	690
100	FORMAT (6(2X,I3,2X,1PE10.3))	SEE	700
110	FORMAT (107H1 STEP NO. TIME ORIGINAL VALUE COMPUTED	SEE	710
	1ED VALUE PERCENT DIFFERENCE IPR0B=,I3)	SEE	720
120	FORMAT (16,1P4F18.5)	SEE	730
130	FORMAT (21H0 ROOT-MEAN-SQUARE=1PE12.5)	SEE	740
140	FORMAT (13H0 ORIG INT =,1PE12.5,14H FITTED INT= ,1PE12.5,15H PERSEE	SEE	750
	1CENT DIFF =,1PE12.5)	SEE	760
150	FORMAT (40HCOMPARISON OF ORIGINAL WITH FITTED DATA,)	SEE	770
160	FORMAT (10HTIME(SEC))	SEE	780
170	FORMAT (10H FX(I))	SEE	790
	END	SEE	800
	SUBROUTINE PCMOUT (LXX)	PCH	
C		PCH	10
C	ROUTINE PUNCHES OUT PARAMETERS IN ENDF-LIKE FORMAT.	PCH	20
C		PCH	30
	COMMON /PULSIN/ ALAMDA(50), FX(200), T(401), KTRM, ITSP, IPR0B,	PCH	40
	1 NIN, NOUT	PCH	50
	COMMON /PULSDAT/ NDT, EB(25), GX(25,400), NERG, ALF(25,50), ALAM(2PCH	PCH	60
	1 5,50)	PCH	70
	COMMON /MANI/ TC(100), TITL(8), KTR(50), NS(10), KKN(25), DIFLIM	PCH	80
	COMMON /ENDF/ MAT, MF, MT, RUNTIM, NPUN	PCH	90
	DIMENSION F(10), P(10), L(10), LXX(20)	PCH	100
	NPUN=1	PCH	110
	C1=0.	PCH	120
	NUL=0	PCH	130
	NSEQ=1	PCH	140
	WRITE (NOUT,30) (TITL(I),I=1,7),MAT,MF,MT,NSEQ	PCH	150
	WRITE (NPUN,30) (TITL(I),I=1,7),MAT,MF,MT,NSEQ	PCH	160
	NSEQ=NSEQ+1	PCH	170
	WRITE (NOUT,40) C1,C1,NUL,NUL,NUL,NERG,MAT,MF,MT,NSEQ	PCH	180
	WRITE (NPUN,40) C1,C1,NUL,NUL,NUL,NERG,MAT,MF,MT,NSEQ	PCH	190
	DO 20 K=1,NERG	PCH	200
	NPX=ALF(K)	PCH	210
	LPX=LXX(K)	PCH	220
	ER1=EB(K)	PCH	230
	ER2=EB(K+1)	PCH	240
	CALL CXFP (ER1,F(1),P(1),L(1))	PCH	250
	CALL CXFP (ER2,F(2),P(2),L(2))	PCH	260
	NSEQ=NSEQ+1	PCH	270
	WRITE (NOUT,50) ((F(I),P(I),L(I),I=1,2),NUL,NUL,NUL,K,MAT,MF,MT	PCH	280
	1 ,NSEQ)	PCH	290
	WRITE (NPUN,50) ((F(I),P(I),L(I),I=1,2),NUL,NUL,NUL,K,MAT,MF,MT	PCH	300
	1 ,NSEQ)	PCH	310
	ER1=1(1)	PCH	320
	ER2=1(LPX)	PCH	330

CALL CXFP (E1,F(1),P(1),L(1))	PCH	340
CALL CXFP (E2,F(2),P(2),L(2))	PCH	350
NSEQ=NSEQ+1	PCH	360
WRITE (NOUT,50) ((F(I),P(I),L(I),I=1,2),NUL,NUL,NUL,NPX,MAT,MF,M	PCH	370
1,NSEQ)	PCH	380
WRITE (NPUN,50) ((F(I),P(I),L(I),I=1,2),NUL,NUL,NUL,NPX,MAT,MF,M	PCH	390
1,NSEQ)	PCH	400
ALF(K,NPX+1)=0.	PCH	410
ALF(K,NPX+2)=0.	PCH	420
ALAM(K,NPX+1)=0.	PCH	430
ALAM(K,NPX+2)=0.	PCH	440
J1=1	PCH	450
10 CONTINUE	PCH	460
E1=ALF(K,J1)	PCH	470
E2=ALF(K,J1+1)	PCH	480
E3=ALF(K,J1+2)	PCH	490
FX1=ALAM(K,J1)	PCH	500
FX2=ALAM(K,J1+1)	PCH	510
FX3=ALAM(K,J1+2)	PCH	520
NSEQ=NSEQ+1	PCH	530
CALL CXFP (E1,F(1),P(1),L(1))	PCH	540
CALL CXFP (FX1,F(2),P(2),L(2))	PCH	550
CALL CXFP (E2,F(3),P(3),L(3))	PCH	560
CALL CXFP (FX2,F(4),P(4),L(4))	PCH	570
CALL CXFP (E3,F(5),P(5),L(5))	PCH	580
CALL CXFP (FX3,F(6),P(6),L(6))	PCH	590
WRITE (NOUT,60) (F(I),P(I),L(I),I=1,6),MAT,MF,MT,NSEQ	PCH	600
WRITE (NPUN,60) (F(I),P(I),L(I),I=1,6),MAT,MF,MT,NSEQ	PCH	610
IF (J1+2).GE.NPX) GO TO 20	PCH	620
J1=J1+3	PCH	630
GO TO 10	PCH	640
20 CONTINUE	PCH	650
MAT1=0	PCH	660
MF1=0	PCH	670
MT1=0	PCH	680
MEND=-1	PCH	690
NSEQ=NSEQ+1	PCH	700
WRITE (NOUT,70) MAT,MF,MT1,NSEQ	PCH	710
WRITE (NPUN,70) MAT,MF,MT1,NSEQ	PCH	720
NSEQ=NSEQ+1	PCH	730
WRITE (NOUT,70) MAT,MF1,MT1,NSEQ	PCH	740
WRITE (NPUN,70) MAT,MF1,MT1,NSEQ	PCH	750
NSEQ=NSEQ+1	PCH	760
WRITE (NOUT,70) MAT1,MF1,MT1,NSEQ	PCH	770
WRITE (NPUN,70) MAT1,MF1,MT1,NSEQ	PCH	780
WRITE (NOUT,70) MEND	PCH	790
WRITE (NPUN,70) MEND	PCH	800
STOP	PCH	810
C	PCH	820
30 FORMAT (6A10,A6,I4,I2,I3,I5)	PCH	830
40 FORMAT (1P2E11,5,4I11,14,I2,I3,I5)	PCH	840
50 FORMAT (2(F8.5,A1,I2),4I11,I4,I2,I3,I5)	PCH	850
60 FORMAT (6(F8.5,A1,I2),I4,I2,I3,I5)	PCH	860
70 FORMAT (6BX,I4,I2,I3,I5)	PCH	870
END	PCH	880
SUBROUTINE CXFP (X,F,S,N)	CXF	10
C *****	*CXF	20
C CONVERT X FOR PUNCHING	*CXF	30
C X = FLOATING POINT NUMBER = F*10.0**N	*CXF	40
C F = 0.999995 LE F LT 9.99995	CXF	50
C S = SIGN (HOLLERITH + OR -) OF EXPONENT	*CXF	60
C N = EXPONENT	*CXF	70
C *****	CXF	80
C DATA SP /1H./, SM /1H./	CXF	90
C IF (A.NE.0.0) GO TO 10	CXF	

F=0.0	CXF	100
S=SP	CXF	110
N=0	CXF	120
RETURN	CXF	130
10 N=ALOG10(ABS(X))	CXF	140
IF (ABS(X)-1.0) 40,20,20	CXF	150
20 F=X/10.0**N	CXF	160
S=SP	CXF	170
IF (ABS(F)-9.999995) 70,30,30	CXF	180
30 F=F/10.0	CXF	190
N=N+1	CXF	200
GO TO 70	CXF	210
40 N=1-N	CXF	220
F=X*10.0**N	CXF	230
S=SM	CXF	240
IF (ABS(F)-9.999995) 70,50,50	CXF	250
50 F=F/10.0	CXF	260
N=N-1	CXF	270
IF (N) 60,60,70	CXF	280
60 S=SP	CXF	290
70 CONTINUE	CXF	300
RETURN	CXF	310
END	CXF	320
SUBROUTINE LSS (N,M,I,A,R,D,DET)	LSS	
DIMENSION A(I,N), R(I,M), COM2(5), COM3(5), D(N)	LSS	10
DOUBLE S1, S2, DUTPRO	LSS	20
DATA (COM2(J),J=1,5) /50HLSS SINGULAR SYSTEM. INPUT DESTROYED.	N LSS	30
1 = /	LSS	40
DATA (COM3(J),J=1,5) /50HLSS CALLED WITH N.LE.0 OR N.GT.I.	N LSS	50
1 = /	LSS	60
	LSS	70
	LSS	80
	LSS	90
	LSS	100
	LSS	110
	LSS	120
	LSS	130
	LSS	140
	LSS	150
	LSS	160
	LSS	170
	LSS	180
	LSS	190
	LSS	200
	LSS	210
	LSS	220
	LSS	230
	LSS	240
	LSS	250
	LSS	260
	LSS	270
	LSS	280
	LSS	290
	LSS	300
	LSS	310
	LSS	320
	LSS	330
	LSS	340
	LSS	350
	LSS	360
	LSS	370
	LSS	380
	LSS	390
	LSS	400
	LSS	410
	LSS	420
	LSS	430
	LSS	440

C
 C LIRMSG IS ONLY FOR LASL STATISTICS
 C CALL LIRMSG (10H 8 LSS)
 C TO PUT MESSAGE IN SYSTEM DAYFILE
 C
 NN=N
 IF (NN.LE.0.OR.NN.GT.I) GO TO 140
 MM=M
 SN=1.
 DO 90 J=1,NN
 L=J-1
 IF (J.EQ.NN) GO TO 70
 T=ABD(A(J,J))
 M1=J
 M2=J+1
 DO 10 K=M2,NN
 X=ABD(A(K,J))
 IF (A.LE.T) GO TO 10
 T=X
 M1=K
 10 CONTINUE
 IF (M1.EQ.J) GO TO 40
 DO 20 K=1,NN
 T=A(J,K)
 A(J,K)=A(M1,K)
 A(M1,K)=T
 20 SN=SN+1
 IF (MM.LE.0) GO TO 40
 DO 30 K=1,MM
 T=R(J,K)
 B(J,K)=R(M1,K)
 R(M1,K)=T
 30 IF (A(J,J).EQ.0.) GO TO 130
 DO 60 K=M2,NN
 S1=0.
 S2=0.
 IF (L.EQ.0) GO TO 50
 S=DUTPRO(L,A(J,1),I,A(1,K),1)

50	A(J,K)=(A(J,K)-S1)/A(J,J)	LSS	450
	S2=DOTPRU(J,A(K,1),I,A(1,M2),1)	LSS	460
60	A(K,M2)=A(K,M2)-S2	LSS	470
70	IF (MM.LE.0) GO TO 90	LSS	480
	IF (A(J,J).EQ.0.) GO TO 130	LSS	490
	DO 80 K=1,MM	LSS	500
	S1=0.	LSS	510
	IF (L.EQ.0) GO TO 80	LSS	520
	S1=DOTPRU(L,A(J,1),I,B(1,K),1)	LSS	530
80	B(J,K)=(B(J,K)-S1)/A(J,J)	LSS	540
90	CONTINUE	LSS	550
	DET=A(1,1)*SN	LSS	560
	IF (DET.EQ.0.) GO TO 130	LSS	570
	IF (N.EQ.1) GO TO 150	LSS	580
	DO 100 J=2,NN	LSS	590
100	DET=DET*A(J,J)	LSS	600
	IF (DET.EQ.0.) GO TO 130	LSS	610
	IF (MM.EQ.0) GO TO 150	LSS	620
	M3=NN-1	LSS	630
	DO 120 J=1,MM	LSS	640
	DO 110 L=1,M3	LSS	650
	M1=NN-L	LSS	660
	S1=0.	LSS	670
	M2=M1+1	LSS	680
	K=NN-M2+1	LSS	690
	S1=DOTPRU(K,A(M1,M2),I,B(M2,J),1)	LSS	700
110	B(M1,J)=B(M1,J)-S1	LSS	710
120	CONTINUE	LSS	720
	GO TO 130	LSS	730
130	CALL LAHRT (1,COMP,N)	LSS	740
	DET=0.	LSS	750
	GO TO 150	LSS	760
140	CALL LAHRT (1,COM3,N)	LSS	770
	DET=0.	LSS	780
150	RETURN	LSS	790
	END	LSS	800

IDENT	DOTPRU	DOT	1
ENTRY	DOTPRU	DOT	11
VPD	42/0HNDOTPRU,18/5	DOT	21
*****		DOT	31
*		*DOT	41
*	*DOTPRU* IS A FORTRAN COMPATIBLE FUNCTION-TYPE SUBPROGRAM	*DOT	51
*		*DOT	61
*	CALLING SEQUENCE Z = DOTPRU(N, X, IX, Y, IY)	*DOT	71
*		*DOT	81
*	WHERE -X- AND -Y- ARE REAL VECTORS EACH CONTAINING	*DOT	91
*	-N- ELEMENTS.	DOT	101
*	-IX- AND -IY- ARE THE SPACING BETWEEN SUCCESSIVE	*DOT	111
*	ELEMENTS OF -X- AND -Y- RESPECTIVELY	*DOT	121
*		*DOT	131
*	THE RESULT RETURNED BY *DOTPRU* IS THE INNER PRODUCT (X,Y) OF THE	*DOT	141
*	VECTORS -X- AND -Y-. I.E. THE SUM OF X(I)*Y(I) FOR I=1 TO N	*DOT	151
*		*DOT	161
*	THE RESULT IS DOUBLE PRECISION BUT WILL BE USED AS SINGLE	*DOT	171
*	PRECISION UNLESS *DOTPRU* IS DECLARED TO BE DOUBLE	*DOT	181
*	PRECISION IN THE CALLING PROGRAM.	*DOT	191
*		*DOT	201
*	THE RESULT IS ZERO IF N = 0; INFINITE IF N .LT. 0	*DOT	211
*		*DOT	221
*****		*DOT	231
*		*DOT	241
*	MODIFIED 9/15/72 BY J SOPKA, C-4 TO ELIMINATE ACCESS OUT OF RANGE	*DOT	251
*	AND IMPROVE IN-CODE DOCUMENTATION	*DOT	261
*		*DOT	271
*****		*DOT	281

OUTPRO	DATA	0		OUT	291
	DA2	B1	FETCH -N- → X2	OUT	301
	MAU	0	ZERO X0	OUT	311
	DA4	B3	FETCH -IX- → X4	OUT	321
	DA5	B5	FETCH -IY- → X5	OUT	331
	DA1	B2	FETCH 1ST ELEMENT OF -X- → X1	OUT	341
	DA3	B4	FETCH 1ST ELEMENT OF -Y- → X3	OUT	351
	DB7	2	2 → B7	OUT	361
	DB1	A2	-N- → B1	OUT	371
	LA2	B9	SHIFT LO-ORDER BIT OF -N- INTO SIGN BIT X2	OUT	381
	DB5	A5	-IY- → B5	OUT	391
	MA5	0	ZERO X5	OUT	401
	DB3	A4	-IX- → B3	OUT	411
	MA6	AC	-IY- → B6	OUT	421
	LE	B1,B7,TWO	BRANCH IF -N- .LE. 2	OUT	431
	DB2	B3	-IX- → B2	OUT	441
	NG	A2,NUD	BRANCH IF -N- IS ODD, LO-ORDER HIT ON.	OUT	451
*****				OUT	461
*	HI-ORDER PART OF THE INNER PRODUCT IS ACCUMULATED IN X0,			OUT	471
*	LO-ORDER PART IN X5.			OUT	481
*				OUT	491
*				OUT	501
*****				OUT	511
LOOP	FA2	X1+X3	UPPER PROD X,Y	OUT	521
	FA6	X0+X5		OUT	531
	DA4	X1+X3	LOWER PROD X,Y	OUT	541
	DA1	A1+B3	FETCH NEXT ELEMENT OF -X-	OUT	551
	DA7	X0+X5		OUT	561
	DA3	A3+B5	FETCH NEXT ELEMENT OF -Y-	OUT	571
	DA5	A2+X6		OUT	581
	FA0	A2+X6		OUT	591
	NU			OUT	601
	FA5	X4+X5		OUT	611
	MA0	X0		OUT	621
	FA5	A5+X7		OUT	631
NON	FA2	X1+X3	UPPER PROD X,Y	OUT	641
	FA6	X0+X5		OUT	651
	DA4	X1+X3	LOWER PROD X,Y	OUT	661
	DA1	A1+B2	FETCH NEXT ELEMENT OF -X-	OUT	671
	DA7	X0+X5		OUT	681
	DA3	A3+B6	FETCH NEXT ELEMENT OF -Y-	OUT	691
	DA5	A2+X6		OUT	701
	FA0	A2+X6		OUT	711
	DB1	B1-B7	DECREMENT ELEMENT COUNTER B1	OUT	721
	FA5	A4+X5		OUT	731
	MA0	X0		OUT	741
	FA5	A5+X7		OUT	751
	UI	B1,B7,LOOP	LOOP BACK IF MORE THAN 2 ELEMENTS STILL	OUT	761
*	REMAIN TO BE PROCESSED			OUT	771
	LE	B1,B0,FINISH	BRANCH IF LAST 2 ELEMENTS ALREADY PROCESSED	OUT	781
	DB2	B0	ZERO OUT -IX- AND -IY- FOR 2ND SET OF	OUT	791
	DB6	B0	FETCHES TO ELIMINATE ACCESS OUT OF RANGE	OUT	801
	EW	B0,B0,LOOP	LOOP BACK TO PROCESS LAST 2 ELEMENTS	OUT	811
*****				OUT	821
*				OUT	831
*	HI-ORDER PART OF THE RESULT IS RETURNED IN X6, LO-ORDER PART IN X7			OUT	841
*				OUT	851
*****				OUT	861
FINISH	FA1	X0+X5		OUT	871
	DA2	X0+X5		OUT	881
	MA3	A1		OUT	891
	MA4	A2		OUT	901
	DA7	A3+X4		OUT	911
	FA6	A3+X4		OUT	921
	EW	B0,B0,OUTPRO	RETURN TO CALLING PROGRAM	OUT	931
TWO	LE	B1,B0,ZERO	BRANCH IF -N- .LE. 0	OUT	941
	DB2	B0	ZERO OUT -IX- AND -IY- FOR 2ND SET OF	OUT	951
	DB6	B0	FETCHES TO ELIMINATE ACCESS OUT OF RANGE	OUT	961

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      INE  B1,B7,NON      BRANCH IF -N= .EQ. 1      DOT 971
      EW  B0,BU,LOOP      BRANCH TO PROCESS 2 ELEMENTS      DOT 981
ZERO  LI  B1,B6,IND      BRANCH IF -N= .LT. 0      DOT 991
      SA7  B0      IF N = 0      DOT 1001
      MA6  0      RESULT = ZERO      DOT 1011
      EW  B0,BU,DUTPRO      RETURN TO CALLING PROGRAM      DOT 1021
      IN0  MA7 1      IF N .LT. 0      DOT 1031
      MA6 1      RESULT = INFINITE      DOT 1041
      EW  B0,BU,DUTPRO      RETURN TO CALLING PROGRAM      DOT 1051
      END0      DOT 1061

      SUBROUTINE LABRT (ISW,LMOL,INX)      LAB
      DIMENSION LMOL(5)      LAB 10
      LOGICAL PS, TS      LAB 20
      IF ((ISW.EQ.0).OR.(ISW.GT.5)) RETURN      LAB 30
      GO TO (10,20,30,40,50), ISW      LAB 40
      DATA NP /10/, PS /.TRUE./, TS /.FALSE./      LAB 50
10    IF (PS.AND.(NP.GT.0)) PRINT 60, LMOL,INX      LAB 60
      NP=NP-1      LAB 70
      IF (IS) STOP      LAB 80
      RETURN      LAB 90
20    PS=.FALSE.      LAB 100
      RETURN      LAB 110
30    PS=.TRUE.      LAB 120
      NP=INX      LAB 130
      RETURN      LAB 140
40    TS=.TRUE.      LAB 150
      RETURN      LAB 160
50    TS=.FALSE.      LAB 170
      RETURN      LAB 180
C 60    FORMAT (1H0,9X,5A10,3X,U6)      LAB 190
      END      LAB 200
      END      LAB 210

```

APPENDIX C

SOME USEFUL FITS OF THE PULSE DATA

This appendix contains a listing (Table IC) of the parameters for 11 energy group pulse fits for 5 ENDF/B-IV fission-yield sets. The parameters for the fits, given in Table IC, are in an ENDF/B-like format and are for ^{233}U thermal, ^{235}U thermal, ^{238}U fast, ^{239}Pu thermal, and ^{232}Th fast neutron incident energy for both beta- and gamma-decay energy spectra.

In the ENDF-like format, columns 66-70 contain the "MAT-No." that is used to identify the target nucleus. The MAT-Nos. used in Table IC are the same as those used in ENDF/B-IV and are as follows.

<u>MAT No.</u>	<u>Target Nucleus</u>	<u>MAT No.</u>	<u>Target Nucleus</u>
1260	^{233}U	1264	^{239}Pu
1261	^{235}U	1296	^{232}Th
1262	^{238}U		

A zero in column 70 signifies the end of the data for that MAT. The next two columns, 71 and 72, are used for the MF-No., which identifies the energy of the incident neutron. Here only two numbers are used; MF=80 denotes "thermal" neutrons, and MF=81 denotes "fast" neutrons. A zero in column 72 signifies the end of the data for that MF.

Columns 73-75 contain the MT-Nos. that are used here to identify whether the parameters are for a fit for the beta decay energy spectrum (MT=802) or a fit for the gamma decay energy spectrum (MT=803). A zero in column 75 signifies the end of the data for that MT.

The data for a particular MAT, MF, MT combination are given in field widths of 11 and are organized as follows.

1. The sixth field on the first data card (number 11 in this case) gives the number of broad-energy groups for which the pulse fits are given.
2. On the next card, the first two fields give the energy bounds for the group in MeV; 0.1 to 0.9 MeV for group 1, for example. The sixth field gives the group number; 1, 2, 3, 4, etc.
3. The first two fields on the third data card give the cooling-time range in s over which the fit was made; 0.1 to 1×10^9 s for group 1, for example. The sixth field gives the number of pairs of parameters used in the fit; 16 for group 1, for example.
4. Next follows a number of cards containing the α_i and λ_i used for the pulse fit.

For example, for group 1, $fc(t) = \sum_{i=1}^{16} \alpha_i e^{-\lambda_i t}$, so six cards are needed to contain the sixteen parameters needed for the fit.

TABLE IC

USEFUL FITS IN 11 GROUPS

11 GROUP FITS FROM 2PT/TIME DECADE REFPHYD DATA, JUN78, RJL/DCC, LASL -0-0-0											0
0.	0.	0	0	0	0	0	0	0	0	0	1
1.00000- 1	4.00000- 1	0	0	0	0	0	0	0	0	0	2
1.00000- 1	1.00000+ 9	0	0	0	0	0	0	0	0	0	3
1.17817- 3	1.31789+ 0	7.30423- 4	1.23996- 1	3.33156- 4	1.67269- 2	2126080802	4	0	0	0	4
4.18899- 5	3.14840- 3	2.95328- 5	1.07728- 3	0.50174- 6	4.16289- 4	4126080802	5	0	0	0	5
3.70218- 6	1.43197- 4	7.07240- 7	4.15921- 5	4.86582- 7	1.53794- 5	5126080802	6	0	0	0	6
6.29012- 8	4.52958- 6	3.25016- 8	1.27831- 6	7.57565- 9	4.98598- 7	7126080802	7	0	0	0	7
4.22751- 9	2.20467- 7	6.79934- 10	7.57640- 8	3.61435- 11	1.61480- 8	8126080802	8	0	0	0	8
1.82696- 11	8.07199- 10	0.00000+ 0	0.00000+ 0	0.00000+ 0	0.00000+ 0	0126080802	9	0	0	0	9
4.00000- 1	0.00000- 1	0	0	0	0	2126080802	10	0	0	0	10
1.00000- 1	1.00000+ 9	0	0	0	0	17126080802	11	0	0	0	11
7.88016- 3	1.48645+ 0	1.69559- 3	2.99261- 1	3.95672- 3	1.22066- 1	1126080802	12	0	0	0	12

1,72823-	3	1,85960-	2	2,42225-	4	3,77993-	3	1,03123-	4	1,30779-	3	126482802	13
3,45285-	5	4,54434-	4	1,23831-	5	1,57415-	4	2,10957-	6	4,42210-	5	126080802	14
1,47045-	6	1,70484-	5	2,02086-	7	5,76043-	6	5,05948-	8	1,44126-	6	6126080802	15
9,84458-	9	4,62132-	7	6,85099-	9	2,03147-	7	1,23372-	9	8,09713-	8	8126482802	16
1,34023-10	2	1,1370-	8	1,52754-11	8	6,2735-10	7	2,00000+	7	2,00000+	7	0126080802	17
9,20700-	1	1,35400+	0		0		0		0			3126480802	18
1,00100-	1	1,00000+	9		0		0		0			17126480802	19
1,57106-	2	1,60646+	0	4,61113-	3	3,54381-	1	7,61468-	3	1,27422-	3	1126082802	20
2,08652-	3	2,01239-	2	3,61986-	4	4,49169-	3	1,22266-	4	1,40394-	4	3126080802	21
3,73673-	5	4,73914-	4	1,34546-	5	1,78053-	4	2,61936-	6	5,48139-	5	5126080802	22
1,43189-	6	2,31377-	5	1,27872-	7	7,06160-	6	1,19771-	8	1,33661-	6	6126482802	23
3,33251-	9	2,98222-	7	2,12419-	9	1,44930-	7	6,43493-10	5	5,93584-	7	8126482802	24
1,85601-10	2	2,19179-	8	1,09017-11	8	5,4770-10	2	0,00000+	0	0,00000+	0	0126080802	25
1,35200+	0	1,80200+	0		0		0		0			4126480802	26
1,00000-	1	1,00000+	9		0		0		0			17126080802	27
2,51541-	2	1,69336+	0	8,17767-	3	3,24759-	1	1,05374-	2	1,36190-	2	1126082802	28
3,92872-	3	2,17691-	2	3,68696-	4	4,51814-	3	1,40071-	4	1,44406-	4	3126080802	29
3,62801-	5	4,75951-	4	1,03436-	5	1,71545-	4	1,73613-	6	5,04944-	5	5126080802	30
1,61758-	6	2,78985-	5	8,53165-	8	9,24376-	6	4,06210-	9	1,45389-	6	6126080802	31
4,34269-10	2	2,94410-	7	4,04202-11	5	8,5841-	8	4,19332-10	2	2,83529-	7	8126480802	32
4,22893-11	2	2,24316-	8	1,48324-11	7	8,25200-10	0	0,00000+	0	0,00000+	0	0126480802	33
1,82200+	0	2,20000+	0		0		0		0			5126080802	34
1,00000-	1	1,00000+	9		0		0		0			16126080802	35
2,67997-	2	1,75825+	0	9,79129-	3	3,97575-	1	1,20350-	2	1,41739-	2	1126080802	36
3,68242-	3	2,38143-	2	3,81235-	4	6,11213-	3	1,15250-	4	1,53819-	4	3126480802	37
3,26646-	5	5,24278-	4	4,77670-	6	1,74888-	4	1,29386-	6	4,76461-	5	5126080802	38
1,18018-	6	3,13581-	5	6,46069-	8	1,13694-	5	5,21521-10	1	1,00596-	6	6126080802	39
2,33656-12	1	1,92662-	7	3,66427-10	2	7,7594-	8	2,63892-14	7	7,73440-	9	8126480802	40
4,12290-12	7	8,37000-10	0	0,00000+	0	0,00000+	0	0,00000+	0	0,00000+	0	0126480802	41
2,20000+	0	2,60000+	0		0		0		0			6126480802	42
1,00000-	1	1,00000+	9		0		0		0			16126480802	43
2,03443-	2	1,85815+	0	1,20439-	2	5,25591-	1	1,37984-	2	1,41964-	2	1126480802	44
3,12443-	3	2,42660-	2	4,22520-	4	5,91974-	3	1,04156-	4	1,50895-	4	3126080802	45
2,10862-	5	5,05700-	4	3,24067-	6	1,84159-	4	5,24379-	7	4,99604-	5	5126080802	46
1,24844-	6	3,63546-	5	2,71195-	8	1,40084-	5	2,08737-11	6	6,97304-	6	8126080802	47
1,30354-10	2	2,68711-	8	3,70320-11	2	8,5321-	8	2,93500-11	2	2,45991-	7	8126080802	48
2,72400-14	7	8,03394-10	0	0,00000+	0	0,00000+	0	0,00000+	0	0,00000+	0	0126480802	49
2,62400+	0	3,00000+	0		0		0		0			7126080802	50
1,00000-	1	1,00000+	9		0		0		0			15126480802	51
2,47528-	2	2,09493+	0	1,31971-	2	5,60221-	1	1,31090-	2	1,52802-	2	1126080802	52
2,87281-	3	2,60491-	2	3,68876-	4	5,95494-	3	8,54516-	5	1,67914-	5	3126480802	53
2,11128-	5	5,89142-	4	1,30756-	6	1,66618-	4	2,12659-	7	6,67863-	6	5126080802	54
1,43713-	6	4,76290-	5	3,82280-	9	1,41515-	5	1,23430-11	9	3,3799-	7	7126080802	55
2,51502-11	3	0,1380-	8	2,16852-11	2	3,6158-	8	6,07421-17	1	0,00000-	0	9126080802	56
3,20000+	0	4,00000+	0		0		0		0			8126080802	57
1,00000-	1	1,00000+	9		0		0		0			15126480802	58
3,00203-	2	2,63620+	0	3,32298-	2	6,19487-	1	2,11625-	2	1,35191-	2	1126080802	59
3,44896-	3	2,38179-	2	6,22859-	4	6,83902-	3	1,31045-	4	1,77137-	3	3126080802	60
2,10609-	5	5,87194-	4	1,38031-	6	1,51909-	4	1,05890-	6	6,57357-	5	5126480802	61
1,51295-	6	5,84260-	5	3,57963-	9	1,69857-	5	1,91793-11	1	2,4070-	6	6126480802	62
4,05460-16	1	2,0381-	6	2,63993-12	2	2,1677-	8	4,61356-17	6	0,8415-	10	1126480802	63
4,00000+	0	5,00000+	0		0		0		0			9126080802	64
1,00000-	1	1,00000+	9		0		0		0			14126480802	65
1,76502-	2	2,49308+	0	9,36264-	3	5,21734-	1	1,25463-	2	1,44344-	2	1126080802	66
1,16599-	3	2,83475-	2	2,94050-	4	8,48785-	3	2,77222-	5	2,66519-	5	3126080802	67
7,16539-	7	3,92118-	4	4,73888-	8	6,24396-	5	9,85050-	7	6,92667-	6	5126080802	68
2,31622-10	3	4,5321-	5	2,05706-12	1	0,3762-	6	6,47814-17	1	4,6374-	7	7126480802	69
2,66025-18	2	8,1795-11	2	2,47742-18	2	8,1298-12	4	0,00000+	0	0,00000+	0	0126480802	70
5,00000+	0	6,00000+	0		0		0		0			10126480802	71
1,00000-	1	1,00000+	9		0		0		0			13126080802	72
8,21597-	3	2,59379+	0	4,51384-	3	3,86088-	1	6,33458-	3	1,31950-	3	1126480802	73
3,10322-	4	3,55307-	2	9,50091-	5	1,09562-	2	1,22664-	5	4,31053-	5	3126080802	74
9,04019-	6	1,10666-	3	1,93264-	6	8,85689-	5	1,01233-14	3	1,0931-	6	6126080802	75
2,90196-13	1	0,3353-	6	3,02223-19	1	2,9780-	7	2,11902-20	2	2,70455-	11	1126080802	76
5,87326-20	2	2,42474-12	0	0,00000+	0	0,00000+	0	0,00000+	0	0,00000+	0	0126480802	77
6,00000+	0	7,50000+	0		0		0		0			11126080802	78
1,00000-	1	1,00000+	9		0		0		0			11126080802	79
3,57554-	3	2,46348+	0	1,40706-	3	4,70754-	1	2,80901-	3	1,47840-	3	1126080802	80

1.92368-	4	6.53921-	2	1.78310-	5	1.57295-	2	4.87805-	7	4.97659-	3126480803	81
3.22143-	9	1.74815-	3	3.14936-	10	8.25306-	4	1.91498-	14	2.29724-	4126480803	82
6.48365-	15	1.23766-	6	6.25361-	21	1.03413-	7	0.00000+	2	0.00000+	0126480803	83
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	126480803	84
1.20000-	1	4.00000-	1	0.	0.	0.	0.	0.	0.	0.	11126480803	85
1.20000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	1126480803	86
1.20000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	17126480803	87
1.89325-	2	1.44703+	0	7.05340-	3	1.52217-	1	1.30050-	3	2.43368-	2126480803	88
1.62548-	4	5.76486-	3	4.37230-	5	1.04581-	3	1.87770-	5	5.10305-	4126480803	89
6.94578-	6	2.47235-	4	3.56388-	7	3.74253-	5	2.33710-	7	1.05674-	5126480803	90
6.47575-	8	4.41267-	6	2.95853-	8	1.80254-	6	9.76673-	9	7.23884-	7126480803	91
1.41137-	9	3.23856-	7	1.31078-	10	7.97996-	8	2.05249-	13	2.06029-	8126480803	92
5.64422-	12	1.45327-	8	2.96108-	16	1.20000+	0	0.00000+	0	0.00000+	0126480803	93
4.20000-	1	9.00000+	1	0.	0.	0.	0.	0.	0.	0.	2126480803	94
1.20000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	16126480803	95
8.22035-	2	2.23834+	0	4.77789-	2	8.12574-	1	3.63471-	2	1.87581-	1126480803	96
3.22441-	3	2.31596-	2	5.83374-	4	4.43976-	3	1.81455-	4	1.39806-	3126480803	97
4.37608-	5	4.09459-	4	3.94790-	4	1.76089-	4	2.73226-	6	5.18154-	5126480803	98
1.88664-	6	1.26922-	5	1.41442-	7	4.88961-	6	2.02228-	7	1.91329-	6126480803	99
1.46733-	8	1.22653-	7	1.12433-	10	3.31610-	8	1.38468-	15	8.74440-	9126480803	100
3.11532-	11	7.47294-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	101
9.22000-	1	1.35000+	0	0.	0.	0.	0.	0.	0.	0.	3126480803	102
1.22000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	16126480803	103
1.04238-	2	1.68138+	0	7.17798-	3	3.04452-	1	8.73607-	3	1.11613-	1126480803	104
3.62909-	3	1.90921-	2	2.83618-	4	4.46986-	3	1.89610-	4	1.04538-	3126480803	105
6.82171-	5	5.43310-	4	2.23397-	5	2.29180-	4	2.14063-	6	5.00771-	5126480803	106
1.01774-	6	2.37521-	5	8.44283-	8	6.76027-	6	3.17869-	8	2.07499-	6126480803	107
1.11621-	10	1.29775-	6	2.98279-	9	5.24921-	7	1.50406-	12	2.21089-	8126480803	108
1.61227-	16	4.53200-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	109
1.35000+	0	1.80000+	0	0.	0.	0.	0.	0.	0.	0.	4126480803	110
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	14126480803	111
9.73088-	3	1.32524+	0	7.83103-	3	1.32085-	1	3.91782-	3	1.85026-	2126480803	112
6.03135-	4	5.50922-	3	4.94961-	5	1.29847-	3	4.93247-	5	3.57293-	4126480803	113
3.00000-	6	1.94423-	4	7.72826-	6	6.57317-	5	7.38599-	7	3.09610-	5126480803	114
-1.00000-	8	5.01894-	6	7.76564-	8	6.33444-	7	8.71056-	15	6.33378-	7126480803	115
6.17130-	12	2.70810-	8	2.33063-	16	3.57423-	10	0.00000+	0	0.00000+	0126480803	116
1.00000+	0	2.20000+	0	0.	0.	0.	0.	0.	0.	0.	5126480803	117
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	15126480803	118
2.47866-	3	1.35692+	0	1.91617-	3	1.27042-	1	1.25692-	3	1.73512-	2126480803	119
9.10032-	5	4.63927-	3	6.67399-	5	7.53098-	4	8.93792-	6	4.45432-	4126480803	120
0.23925-	6	1.54208-	4	3.34213-	6	7.92945-	5	6.94403-	7	3.80097-	5126480803	121
5.20338-	9	5.08527-	6	9.06809-	9	2.58810-	6	3.35679-	10	9.51548-	7126480803	122
-6.72091-	12	4.64232-	8	2.77650-	11	2.93285-	6	6.09736-	17	3.31529-	10126480803	123
2.20000+	0	2.60000+	0	0.	0.	0.	0.	0.	0.	0.	6126480803	124
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	13126480803	125
4.23325-	3	1.38942+	0	3.29507-	3	1.31796-	1	1.80627-	3	1.77436-	2126480803	126
2.23452-	4	5.95908-	3	2.43730-	5	6.22426-	4	1.17665-	5	2.81664-	4126480803	127
8.71145-	6	8.68231-	5	5.29131-	7	5.95306-	5	3.25421-	10	1.25122-	6126480803	128
4.76026-	9	6.31576-	7	1.22792-	13	8.10257-	8	7.09248-	14	2.01521-	8126480803	129
5.79528-	17	7.87233-	12	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	130
2.60000+	0	3.20000+	0	0.	0.	0.	0.	0.	0.	0.	7126480803	131
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	14126480803	132
3.59237-	3	1.37718+	0	2.86956-	3	1.31731-	1	1.05739-	3	2.07429-	2126480803	133
1.80551-	4	5.69092-	3	2.94412-	5	1.80819-	3	4.87394-	6	3.96467-	4126480803	134
3.92425-	6	1.95425-	4	4.80228-	7	1.11253-	4	4.81360-	7	7.20150-	5126480803	135
-6.79772-	11	5.92597-	6	9.69156-	11	6.41079-	7	1.54636-	14	8.06270-	8126480803	136
8.37620-	15	1.95412-	8	1.72686-	17	2.96936-	12	0.00000+	0	0.00000+	0126480803	137
3.00000+	0	4.00000+	0	0.	0.	0.	0.	0.	0.	0.	8126480803	138
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	15126480803	139
2.64737-	3	1.26668+	0	2.15189-	3	1.15420-	1	1.52309-	3	1.66084-	2126480803	140
2.92548-	4	5.37662-	3	1.35423-	4	2.52772-	3	5.62011-	6	5.41770-	4126480803	141
3.29488-	5	1.87804-	4	6.76027-	7	1.14637-	4	2.89359-	7	7.69293-	5126480803	142
-1.07323-	11	1.45225-	5	5.24734-	11	7.07436-	7	1.82487-	13	2.28520-	7126480803	143
2.54002-	19	4.91284-	9	7.82941-	19	5.15433-	11	1.02158-	17	1.39532-	10126480803	144
4.00000+	0	5.00000+	0	0.	0.	0.	0.	0.	0.	0.	9126480803	145
1.00000-	1	1.00000+	9	0.	0.	0.	0.	0.	0.	0.	13126480803	146
1.60747-	3	1.80160+	0	1.52883-	3	2.25890-	1	9.83004-	4	3.77723-	2126480803	147
4.09976-	4	5.62224-	3	1.25744-	4	4.22700-	3	6.99651-	6	1.16040-	3126480803	148
3.09706-	8	2.06360-	4	2.67969-	8	8.24140-	5	9.73688-	9	6.18350-	5126480803	149

1.19193-11	1.16122+ 6	5.06651-12	7.64220- 7	1.52415-13	4.36754- 7	126482803	150
2.33121-19	3.78240+ 11	0.23000+ 0	0.23000+ 0	0.23000+ 0	0.23000+ 0	126482803	151
5.02720+ 0	6.10000+ 0	0	0	0	0	126482803	152
1.04440- 1	1.00220+ 7	0	0	0	0	126482803	153
1.27454- 3	2.91445+ 0	8.78971- 4	0.41442- 1	1.44623- 3	1.78353- 1	126482803	154
1.92723- 4	5.69186- 2	5.41882- 5	1.10420- 2	1.74079- 5	5.97661- 3	126482803	155
2.31468- 5	4.12612- 3	5.69813- 7	1.58143- 3	4.10434- 8	7.85728- 4	126482803	156
1.23318-13	1.36270- 7	4.11718-12	7.50078- 7	5.08962-14	5.73601- 8	126482803	157
6.00000+ 0	7.50000+ 0	0	0	0	0	1126080803	158
1.12000- 1	1.00000+ 7	0	0	0	0	1126080803	159
2.65368- 4	2.23454+ 0	1.11320- 4	5.36125- 1	2.37870- 4	1.53795- 1	126482803	160
9.54509- 6	1.08410- 2	6.16453- 6	1.18887- 2	1.18051- 6	1.01567- 6	2126452803	161
5.03227-10	1.55458- 3	7.03980-14	0.19418- 5	2.17311-13	0.43794- 8	7126382803	162
6.41982-13	6.80326- 7	1.14132-15	1.80848- 7	0.00000+ 0	0.20000+ 0	0126482803	163
						126480 0	164
						1264 0 0	165
						0 0 0	166
0.	0.	0	0	0	0	1126182802	1
1.00000- 1	4.00000- 1	0	0	0	0	1126182802	2
1.00000- 1	1.00000+ 9	0	0	0	0	16126182802	3
2.76879- 3	1.45381+ 0	1.28097- 3	1.38592- 1	4.76613- 4	1.70696- 4	2126182802	4
5.01187- 5	2.40758- 3	2.57695- 5	9.23360- 4	9.36897- 6	3.78094- 6	4126182802	5
3.80721- 6	1.47429- 4	6.97162- 7	4.22706- 5	5.25675- 7	1.47919- 5	5126182802	6
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4.04634- 9	2.30415- 7	7.20339-10	7.66225- 8	4.66955-11	1.58589- 8	8126182802	8
1.50326-11	8.01828-10	0.00000+ 0	0.00000+ 0	0.00000+ 0	0.00000+ 0	0126182802	9
4.00000- 1	9.00000- 1	0	0	0	0	2126182802	10
1.00000- 1	1.00000+ 9	0	0	0	0	17126182802	11
1.82626- 2	1.66124+ 0	5.81826- 3	3.21188- 1	5.02635- 3	1.02291- 1	1126140802	12
2.41635- 3	1.04530+ 2	2.47292- 4	3.08907- 3	1.10704- 4	1.25923- 4	3126182802	13
3.75435- 5	4.35588- 4	1.28235- 5	1.66976- 4	1.86468- 6	4.67802- 5	5126182802	14
1.59380- 6	1.70337- 5	2.33907- 7	5.93531- 6	5.02395- 0	1.40775- 0	6126182802	15
1.07640- 8	5.22256- 7	6.05622- 9	2.20085- 7	1.32156- 9	8.12784- 8	8126182802	16
1.24375-10	2.09389- 8	1.25056-11	7.91748-10	0.00000+ 0	0.00000+ 0	0126182802	17
9.00000- 1	1.35000+ 0	0	0	0	0	3126182802	18
1.00000- 1	1.00000+ 0	0	0	0	0	17126182802	19
3.83659- 2	1.64979+ 0	1.20318- 2	3.21283- 1	9.60829- 3	1.05840- 1	1126182802	20
3.91477- 3	1.99022- 2	3.89244- 4	4.50680- 3	1.30117- 4	1.39059- 4	3126182802	21
4.08136- 5	4.64025- 4	1.38431- 5	1.77849- 4	2.41778- 6	5.86555- 5	5126182802	22
1.51009- 6	2.31590- 5	1.32817- 7	7.22542- 6	1.22656- 8	1.40600- 6	6126182802	23
2.75920- 9	3.66440- 7	2.16993- 9	1.58668- 7	7.13751-10	5.92765- 8	8126182802	24
2.26436-10	2.16017- 8	1.55507-11	7.80343-10	0.00000+ 0	0.00000+ 0	0126182802	25
1.35000+ 0	1.80000+ 0	0	0	0	0	4126182802	26
1.00000- 1	1.00000+ 9	0	0	0	0	17126182802	27
5.65416- 2	1.80668+ 0	2.38013- 2	4.14764- 1	1.53936- 2	1.03639- 2	1126182802	28
4.50877- 3	2.01082- 2	4.07959- 4	4.42658- 3	1.44031- 4	1.42549- 4	3126182802	29
3.91732- 5	4.67963- 4	1.00242- 5	1.77740- 4	1.56505- 6	5.77599- 5	5126182802	30
1.63603- 6	2.79235- 5	7.92657- 8	9.64535- 6	4.39155- 9	1.50572- 6	6126182802	31
3.14023-10	2.38752- 7	8.50378-11	3.40681- 8	4.47296-10	2.76327- 8	8126182802	32
3.65779-11	2.22882- 8	1.30160-11	7.92740-10	0.00000+ 0	0.00000+ 0	0126182802	33
1.80000+ 0	2.20000+ 0	0	0	0	0	5126182802	34
1.00000- 1	1.00000+ 9	0	0	0	0	16126182802	35
6.18052- 2	1.05587+ 0	2.63810- 2	4.44567- 1	1.70417- 2	1.13852- 1	1126182802	36
4.46875- 3	2.19528- 2	4.26161- 4	5.16312- 3	1.19508- 4	1.53295- 4	3126182802	37
3.70577- 5	5.23311- 4	4.31425- 6	1.90692- 4	1.08707- 6	5.18860- 5	5126182802	38
1.17447- 6	3.24598- 5	7.87866- 3	1.22247- 5	5.38424-10	1.15084- 6	6126182802	39
3.25314-11	3.98620- 7	4.33761-10	2.76219- 8	3.78592-13	2.96448- 8	8126182802	40
3.56942-12	7.92691-10	0.00000+ 0	0.00000+ 0	0.00000+ 0	0.00000+ 0	0126182802	41
2.20000+ 0	2.60000+ 0	0	0	0	0	6126182802	42
1.00000- 1	1.00000+ 9	0	0	0	0	16126182802	43
5.68253- 2	2.60230+ 0	4.28895- 2	5.53390- 1	1.84235- 2	1.17430- 1	1126182802	44
4.08763- 3	2.29680- 2	4.68448- 4	5.76010- 3	1.09553- 4	1.59460- 4	3126182802	45
2.01333- 5	5.72222- 4	3.01788- 6	1.97920- 4	2.32268- 7	4.03530- 5	5126182802	46
1.15956- 6	3.61940- 5	1.10940- 8	1.16860- 5	2.60705-11	1.76488- 8	7126182802	47
1.76405-10	3.68330- 8	3.70529-11	2.75715- 8	2.96361-11	2.78522- 8	8126182802	48
2.41157-14	8.77920-10	0.00000+ 0	0.00000+ 0	0.00000+ 0	0.00000+ 0	0126182802	49
2.60000+ 0	3.00000+ 0	0	0	0	0	7126182802	50
1.00000- 1	1.00000+ 9	0	0	0	0	15126182802	51
6.43136- 2	1.93066+ 0	2.65202- 2	5.46034- 1	1.99957- 2	1.38453- 1	1126182802	52

3.55741-	3	2.43432-	2	4.71405-	4	6.14342-	3	8.61565-	5	1.66642-	3126180802	53
2.60424-	5	6.04411-	4	4.25276-	7	2.57148-	4	4.13834-	8	7.12453-	5126180802	54
1.45412-	6	5.05745-	5	1.35054-	8	1.66236-	5	3.93246-	11	1.06953-	6126180802	55
2.63822-	11	3.17196-	8	3.17023-	11	2.34170-	8	1.83652-	17	1.18534-	9126180802	56
3.02020+	0	4.00400+	0				0		0		8126180802	57
1.02000+	1	1.00000+	9				0		0		15126180802	58
1.23767-	1	1.81367+	0	4.34200-	2	4.59880-	1	2.94350-	2	1.24126-	1126180802	59
4.83717-	3	2.33524-	2	7.18957-	4	6.69854-	3	1.35340-	4	1.76473-	3126180802	60
2.33256-	5	6.43176-	4	1.55786-	6	2.38478-	4	3.54762-	7	7.64934-	5126180802	61
1.67968-	6	6.02412-	5	6.39867-	9	1.78196-	5	5.07757-	11	1.07271-	6126180802	62
3.62214-	13	9.82652-	7	3.94038-	12	2.18503-	8	1.43663-	17	8.20427-	10126180802	63
4.00000+	0	5.00000+	0				0		0		9126180802	64
1.00000+	1	1.00000+	9				0		0		14126180802	65
5.21141-	2	1.77610+	0	1.40632-	2	4.09976-	1	1.72253-	2	1.33428-	1126180802	66
1.44244-	3	2.70348-	2	3.68088-	4	8.67964-	3	2.81370-	5	2.69946-	3126180802	67
7.55437-	7	4.76599-	4	4.60218-	9	1.95245-	4	7.22653-	7	6.91984-	5126180802	68
2.32797-	8	8.19146-	5	6.45734-	12	1.23762-	6	1.57561-	16	2.48826-	7126180802	69
5.34692-	19	3.24320-	11	7.58336-	19	2.41884-	12	0.00000+	0	0.00000+	0126180802	70
5.00000+	0	6.00000+	0				0		0		10126180802	71
1.00000+	1	1.00000+	9				0		0		13126180802	72
2.47958-	2	1.76142+	0	7.73591-	3	2.53592-	1	7.31443-	3	1.22365-	1126180802	73
0.27547-	4	3.36318-	2	1.17944-	4	1.12570-	2	1.24718-	5	4.31053-	3126180802	74
1.25140-	7	1.40004-	3	1.32243-	3	6.87533-	5	2.93470-	14	1.22093-	6126180802	75
8.93566-	13	1.03353-	6	4.96936-	19	1.53456-	7	4.16160-	21	3.63928-	11126180802	76
1.59019-	20	1.80657-	12	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126180802	77
6.00000+	0	7.50000+	0				0		0		11126180802	78
1.00000+	1	1.00000+	9				0		0		11126180802	79
1.75542-	2	1.84621+	0	2.37762-	3	3.80248-	1	3.76743-	3	1.47464-	1126180802	80
2.80087-	4	6.18521-	2	2.57530-	5	1.56054-	2	4.51912-	7	4.99222-	3126180802	81
4.97957-	9	1.78649-	3	3.33028-	10	8.25413-	4	4.79124-	13	8.58480-	4126180802	82
2.02482-	14	1.03610-	6	2.00667-	21	2.06826-	7	0.00000+	0	0.00000+	0126180802	83
											126180	84
											11126180803	85
1.00000+	1	4.00000-	1				0		0		1126180803	86
1.00000+	1	1.00000+	9				0		0		19126180803	87
2.81727-	2	2.82757+	0	1.61475-	2	8.89029-	1	1.24735-	2	4.22587-	1126180803	88
6.96348-	3	1.08402-	1	1.87744-	3	4.33672-	2	9.71714-	4	1.60004-	2126180803	89
1.09723-	4	4.18209-	3	4.14073-	5	7.22565-	4	2.04900-	5	5.44143-	4126180803	90
5.83658-	6	2.11393-	4	3.46526-	8	1.37534-	5	3.74680-	7	1.37567-	5126180803	91
7.46642-	9	2.97724-	6	1.31237-	8	8.40208-	7	1.29305-	9	2.59565-	7126180803	92
2.08722-	11	2.80274-	6	1.35579-	12	2.80247-	8	7.68209-	14	8.09492-	9126180803	93
1.09613-	17	1.19086-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126180803	94
0.00000+	0	9.00000+	1				0		0		2126180803	95
0.00000+	1	1.00000+	9				0		0		19126180803	96
1.84161-	1	2.93362+	0	1.01402-	1	1.03920+	0	8.91371-	2	4.25680-	1126180803	97
2.68436-	2	1.36710-	1	6.38638-	3	4.83600-	2	2.05240-	3	1.49010-	2126180803	98
5.84780-	4	3.81150-	3	1.37557-	4	1.02160-	3	1.80822-	5	2.18250-	4126180803	99
4.74585-	5	1.73490-	4	1.53297-	6	3.49170-	5	1.70129-	6	1.19220-	5126180803	100
2.14785-	7	3.29034-	6	2.85053-	8	3.06010-	6	6.34009-	8	1.14770-	6126180803	101
1.47132-	8	1.14540-	7	1.86140-	11	1.58230-	8	3.41440-	13	1.58230-	8126180803	102
2.78367-	11	7.20110-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126180803	103
9.00000+	1	1.35200+	0				0		0		3126180803	104
1.00000+	1	1.00000+	9				0		0		19126180803	105
3.70080-	2	2.56230+	0	2.97600-	2	5.12960-	1	1.38500-	2	1.30490-	1126180803	106
5.70730-	3	4.28240-	2	2.68260-	3	1.44110-	2	5.88940-	4	4.92420-	3126180803	107
1.53400-	4	1.04920-	3	9.49510-	5	5.90630-	4	2.19780-	5	1.97380-	4126180803	108
2.45670-	6	3.60340-	5	6.55250-	7	1.68960-	5	4.19120-	8	2.64920-	6126180803	109
3.25060-	9	6.91700-	7	1.07120-	9	5.69430-	7	2.92050-	11	1.56540-	7126180803	110
1.92510-	12	2.17630-	8	2.44020-	13	2.17630-	8	2.17720-	17	6.77520-	11126180803	111
5.41682-	18	5.35460-	11	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126180803	112
1.35240+	0	1.80000+	0				0		0		4126180803	113
1.00000+	1	1.00000+	9				0		0		14126180803	114
1.54224-	2	2.60302+	0	1.50908-	2	5.01187-	1	8.18830-	3	1.36406-	1126180803	115
5.02757-	3	4.35751-	2	2.94196-	3	1.55072-	2	7.46236-	4	6.91643-	3126180803	116
9.33986-	5	2.51559-	3	6.77752-	5	3.78648-	4	9.79942-	6	1.29181-	4126180803	117
4.05647-	6	4.46512-	5	7.51465-	8	6.31631-	7	7.30439-	12	2.70265-	8126180803	118
2.30393-	16	9.05062-	9	4.36459-	17	6.27813-	11	0.00000+	0	0.00000+	0126180803	119
1.80000+	0	2.00000+	0				0		0		5126180803	120

1.23373-	1	1.33410+	9	0	0	0	16126180803	121		
4.25910-	3	2.55790+	0	3.77566-	3	4.94700-	1 1.83077-	3 1.34410-	1126180803	122
1.41570-	3	3.97850+	2	1.20882-	3	1.43250-	2 1.63591-	4 5.49880-	3126180803	123
6.12293-	5	9.39940+	4	1.86629-	5	5.98660-	4 6.57733-	6 1.73200-	4126180803	124
4.37153-	6	8.35760+	5	3.64684-	7	3.84700-	5 2.07467-	8 1.15070-	5126180803	125
9.06640-	9	2.45130+	6	5.35510-	11	5.31110-	7-4.17564-	12 5.83260-	8126180803	126
2.82216-	11	2.81100+	8	2.93299-	15	1.64668-	8 1.27293-	17 1.46020-	10126180803	127
2.20020+	0	2.60000+	0	0	0	0	0	0	6126180803	128
1.20020-	1	1.20000+	0	0	0	0	0	0	16126180803	129
7.22591-	3	2.48000+	0	6.79147-	3	4.53430-	1 3.49954-	3 1.23040-	1126180803	130
2.04672-	3	2.78320+	2	1.13840-	3	9.86430-	3 3.94452-	5 2.37020-	3126180803	131
2.42358-	5	3.97880+	4	7.70396-	6	1.27710-	4 2.39364-	6 6.64270-	5126180803	132
-4.22440-	9	8.47111-	6	2.09726-	10	5.98080-	7 3.16494-	9 6.67160-	7126180803	133
1.53665-	9	5.77900+	7	1.23903-	13	2.15960-	8 4.77990-	20 9.38200-	11126180803	134
1.46640-	17	1.04240+	11	0.00000+	0	0.00000+	0 0.00000+	0 0.00000+	0126180803	135
2.67200+	0	3.30000+	0	0	0	0	0	0	7126180803	136
1.20020-	1	1.30000+	0	0	0	0	0	0	15126180803	137
5.89171-	3	2.66350+	0	5.67017-	3	5.13407-	1 3.04804-	3 1.38354-	1126180803	138
1.68190-	3	2.75150+	2	7.27511-	4	1.60302-	2 2.65719-	4 7.90924-	3126180803	139
6.97154-	5	3.05380-	3	2.46474-	5	1.46908-	4 9.38050-	6 3.79582-	4126180803	140
4.27331-	7	7.59741-	5	7.20586-	11	7.66677-	7 4.09786-	11 5.82384-	7126180803	141
1.54575-	14	2.12375-	8	1.78360-	22	2.45925-	11 4.33630-	18 2.45775-	12126180803	142
3.22200+	0	4.00000+	0	0	0	0	0	0	8126180803	143
1.20020-	1	1.20000+	0	0	0	0	0	0	16126180803	144
3.99571-	3	2.63674+	0	3.92439-	3	5.08847-	1 2.13233-	3 1.47318-	1126180803	145
2.05007-	3	3.95019-	2	1.32325-	3	1.27392-	2 3.18426-	4 4.17817-	3126180803	146
2.65773-	5	1.46059-	3	5.77121-	6	4.67151-	4 1.84319-	6 1.31245-	4126180803	147
3.95196-	7	1.31190+	4	1.56163-	7	7.49333-	5 8.10831-	11 9.56698-	7126180803	148
2.05073-	11	5.97448-	7	7.37638-	17	1.01114-	7 1.32823-	18 3.42943-	11126180803	149
1.45853-	18	3.16140+	12	2.00000+	0	0.00000+	0 0.00000+	0 0.00000+	0126180803	150
4.20000+	0	5.00000+	0	0	0	0	0	0	9126180803	151
1.20020-	1	1.20000+	0	0	0	0	0	0	16126180803	152
3.10207-	3	2.50850+	0	2.87557-	3	4.95990-	1 1.71152-	3 1.35710-	1126180803	153
1.07626-	3	3.95590+	2	5.61154-	4	1.30330-	2 1.39920-	4 5.95610-	3126180803	154
1.98783-	4	3.91180+	3	1.19133-	6	9.26650-	4 8.04801-	8 3.09690-	4126180803	155
1.98300-	8	8.42180+	5	6.39300-	9	6.89890-	5 4.66038-	11 1.03750-	6126180803	156
2.47843-	14	5.06180+	7	4.98744-	17	1.72020-	7 1.59311-	21 8.82550-	9126180803	157
5.61780-	20	3.35125-	13	0.00000+	0	0.00000+	0 0.00000+	0 0.00000+	0126180803	158
5.20000+	0	6.00000+	0	0	0	0	0	0	10126180803	159
1.20020-	1	1.20000+	0	0	0	0	0	0	12126180803	160
4.34012-	3	2.10007+	0	2.74970-	3	3.51700-	1 1.28471-	3 1.07055-	1126180803	161
1.15145-	4	1.65795-	2	3.57022-	5	4.87315-	3 5.57007-	6 3.18480-	3126180803	162
7.51496-	8	8.58416+	4	2.92101-	9	6.78993-	4 4.09410-	13 1.67665-	4126180803	163
5.39912-	12	1.04071-	6	1.15456-	13	6.16916-	7 9.99597-	24 4.87660-	8126180803	164
6.20000+	0	7.50000+	0	0	0	0	0	0	11126180803	165
1.20020-	1	1.20000+	0	0	0	0	0	0	10126180803	166
8.05801-	4	1.85017+	0	4.59189-	4	2.69962-	1 1.28026-	4 8.55785-	2126180803	167
1.35264-	5	1.36426+	2	4.33460-	7	8.13130-	3 4.50608-	10 1.54721-	3126180803	168
5.41038-	12	7.02246+	4	2.32383-	14	1.26090-	6 1.94953-	14 6.17850-	7126180803	169
8.34431-	23	6.23540+	9	0.00000+	0	0.00000+	0 0.00000+	0 0.00000+	0126180803	170
0.	0.	0.	0.	0.	0.	0.	0.	0.	126180 0	171
0.	0.	0.	0.	0.	0.	0.	0.	0.	1261 0 0	172
0.	0.	0.	0.	0.	0.	0.	0.	0.	0 0 0	173
1.20000-	1	4.20000-	1	0	0	0	0	0	11126281802	1
1.20020-	1	1.00000+	9	0	0	0	0	0	1126281802	2
5.75904-	3	1.37225+	0	2.13591-	3	1.55452-	1 6.33889-	4 1.73561-	2126281802	3
6.01283-	5	2.21289-	3	2.67481-	5	7.88411-	4 8.81022-	6 3.84409-	4126281802	4
3.68856-	6	1.58040+	4	6.94603-	7	4.48145-	5 5.31779-	7 1.51041-	5126281802	5
8.79017-	8	4.51967+	6	3.14593-	8	1.31992-	6 7.29102-	9 5.36790-	7126281802	6
3.66713-	9	5.22210-	7	6.96945-	10	7.94211-	8 5.16569-	11 1.62993-	8126281802	7
1.12908-	11	7.99204-	10	0.00000+	0	0.00000+	0 0.00000+	0 0.00000+	0126281802	8
4.20020-	1	9.20000+	1	0	0	0	0	0	2126281802	9
1.20020-	1	1.20000+	0	0	0	0	0	0	17126281802	10
3.53020-	2	1.67300+	0	1.55163-	2	3.49760-	1 6.31286-	3 8.95714-	2126281802	11
2.98940-	3	1.79950-	2	2.60047-	4	3.85000-	3 1.23547-	4 1.16164-	3126281802	12
3.96978-	5	4.35883-	4	1.27932-	5	1.70100-	4 2.02064-	6 5.06741-	5126281802	13
1.55840-	6	1.81574-	5	2.71105-	7	6.00195-	6 5.15126-	8 1.47654-	6126281802	14
9.17927-	9	4.39845-	7	3.59384-	9	2.77465-	7 1.31058-	9 8.27631-	8126281802	15
										16

1.64111-10	2.26322-8	7.57229-12	7.93607-10	0.00000+	0.00000+	0126281802	17
0.00000-1	1.35000+	0	0	0	0	3126281802	18
1.00000-1	1.00000+	0	0	0	0	17126281802	19
7.33239-2	1.71121+0	3.20980-2	3.76539-1	1.27824-2	9.17627-2	2126281802	20
4.56182-3	1.92411-2	4.33347-4	4.62747-3	1.43255-4	1.35405-5	3126281802	21
4.46339-5	4.77893-4	1.38731-5	1.88938-4	2.23079-6	6.49613-6	5126281802	22
1.39722-6	2.46101-5	1.43645-7	7.43250-6	1.39004-8	1.47763-8	6126281802	23
2.02211-9	3.99385-7	1.63997-9	2.31223-7	7.15109-10	5.79491-8	8126281802	24
2.56785-10	2.45529-8	8.85739-12	7.78698-10	0.00000+	0.40200+	0126281802	25
1.35720+0	1.80000+0	0	0	0	0	4126281802	26
1.00000-1	1.00000+9	0	0	0	0	17126281802	27
1.13640-1	1.75168+0	5.52149-2	3.70291-1	1.71660-2	8.93023-2	2126281802	28
5.38517-3	1.92529-2	4.36030-4	4.47515-3	1.56658-4	1.35287-4	3126281802	29
3.91669-5	4.70143-4	1.01817-5	1.81796-4	8.63550-7	5.51538-7	5126281802	30
1.37733-6	3.00445-5	9.57342-8	9.71258-6	5.04498-9	1.53196-6	6126281802	31
3.19176-10	2.37668-7	1.93256-10	2.42312-8	4.29600-10	2.63340-8	8126281802	32
2.41377-11	2.41736-8	7.34203-12	7.84026-10	0.00000+	0.00000+	0126281802	33
1.80000+0	2.20000+0	0	0	0	0	5126281802	34
1.00000-1	1.00000+9	0	0	0	0	16126281802	35
1.21822-1	1.87484+0	6.71592-2	4.44066-1	2.12184-2	9.79773-2	2126281802	36
5.07381-3	2.26433-2	4.88552-4	6.07128-3	1.24747-4	1.49232-4	3126281802	37
3.83982-5	5.43637-4	4.88178-6	1.98849-4	5.54430-7	4.24415-5	5126281802	38
9.32670-9	3.61740-5	7.68902-8	1.19993-5	7.83048-10	1.37681-6	6126281802	39
1.27515-10	4.38666-7	5.26176-10	2.55611-8	3.78392-12	1.48224-8	8126281802	40
2.02893-12	7.83448-10	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0126281802	41
2.20000+0	2.60000+0	0	0	0	0	6126281802	42
1.00000-1	1.00000+9	0	0	0	0	16126281802	43
1.10965-1	2.72670+0	1.00788-1	5.47410-1	2.45609-2	1.09130-1	1126281802	44
4.94003-3	2.21920-2	5.65793-4	5.70230-3	1.12438-4	1.55870-4	3126281802	45
3.09993-5	5.85090-4	2.66004-6	2.21130-4	5.15608-8	5.81060-6	5126281802	46
9.89861-7	3.82860-5	2.43419-8	1.20950-5	1.16787-10	3.87879-7	7126281802	47
2.91013-10	2.45370-8	2.37260-11	2.69907-8	2.01270-11	2.45360-8	8126281802	48
1.76410-14	1.06030-9	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0126281802	49
2.60000+0	3.00000+0	0	0	0	0	7126281802	50
1.00000-1	1.00000+9	0	0	0	0	15126281802	51
1.28735-1	1.89558+0	6.53667-2	5.20294-1	2.66055-2	1.29667-1	1126281802	52
4.47952-3	2.37821-2	5.67751-4	6.12419-3	8.42430-5	1.70395-4	3126281802	53
3.12943-5	6.48673-4	1.31266-7	3.79941-4	2.14065-8	4.03091-6	5126281802	54
1.08413-6	5.30285-5	1.27304-8	1.47147-5	1.60230-10	1.06127-7	6126281802	55
1.04823-10	2.20906-8	2.21337-11	3.32754-8	2.27319-17	1.18774-8	9126281802	56
3.00000+0	4.00000+0	0	0	0	0	8126281802	57
1.00000-1	1.00000+9	0	0	0	0	15126281802	58
2.38413-1	1.83185+0	1.17618-1	4.79896-1	3.79757-2	1.15181-1	1126281802	59
6.04884-3	2.27090-2	8.07918-4	6.69526-3	1.38865-4	1.78724-4	3126281802	60
2.24824-5	6.22674-4	4.18512-7	4.03944-4	1.33841-7	6.82657-6	5126281802	61
1.42490-6	6.51991-5	6.84070-9	1.45006-5	1.97417-10	1.05066-7	6126281802	62
3.49536-12	1.04363-6	2.74842-11	2.17635-8	1.76944-17	8.20005-10	10126281802	63
4.00000+0	5.00000+0	0	0	0	0	9126281802	64
1.00000-1	1.00000+9	0	0	0	0	14126281802	65
1.03058-1	1.81947+0	5.02733-2	4.53802-1	2.12876-2	1.28099-1	1126281802	66
2.04337-3	2.62339-2	3.79239-4	9.15149-3	2.64236-3	2.77299-3	3126281802	67
6.46653-7	5.24921-4	7.66641-8	1.48026-4	4.64498-7	6.90928-6	5126281802	68
-4.19106-8	8.75553-5	2.59827-11	1.03840-6	3.62012-16	1.86140-7	7126281802	69
8.24034-19	1.62273-11	7.58267-19	1.21034-12	0.00000+0	0.00000+0	0126281802	70
5.00000+0	6.00000+0	0	0	0	0	10126281802	71
1.00000-1	1.00000+9	0	0	0	0	13126281802	72
5.01843-2	1.72907+0	2.61558-2	3.98167-1	9.40725-3	1.12557-1	1126281802	73
5.26350-4	2.73328-2	1.13993-4	1.21143-2	1.08389-5	4.30592-4	3126281802	74
7.97236-8	1.53830-3	8.56142-9	6.88852-5	1.16202-13	1.14260-8	6126281802	75
3.58707-12	1.03413-6	3.84163-19	1.25960-7	8.58998-21	1.81964-11	1126281802	76
1.62471-20	9.03285-13	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0126281802	77
6.00000+0	7.50000+0	0	0	0	0	11126281802	78
1.00000-1	1.00000+7	0	0	0	0	11126281802	79
2.11323-2	1.76891+0	1.24115-2	4.78549-1	4.27413-3	1.29529-1	1126281802	80
2.19466-4	4.55402-2	3.65313-5	1.49796-2	3.85746-7	5.09169-5	3126281802	81
8.16977-9	1.62887-3	3.01321-10	8.33882-4	4.55698-12	8.55842-6	4126281802	82
8.13952-14	1.03632-6	2.00667-22	4.13652-7	0.00000+0	0.00000+0	0126281802	83
0.	0.	0	0	0	0	126281	84
						11126281803	85

1.00000-	1	4.00000-	1	0	0	0	1126281803	86				
1.00000-	1	1.00000+	9	0	0	0	19126281803	87				
8.46919-	2	1.88962+	0	2.99019-	2	6.07957-	1	2.05678-	2	2.85695-	1126281803	88
9.57417-	3	8.64709-	2	1.64000-	3	3.23554-	2	1.02484-	3	1.48350-	2126281803	89
8.11528-	5	3.41533-	3	5.80278-	5	6.74490-	4	1.87412-	5	5.30465-	4126281803	90
5.74489-	6	2.10049-	4	5.59763-	8	9.79809-	6	3.53688-	7	1.37587-	5126281803	91
8.34813-	8	2.96951-	6	1.39109-	8	8.64655-	7	1.21232-	9	2.65920-	7126281803	92
1.90514-	11	2.83662-	8	1.32322-	12	2.25852-	8	1.28241-	13	8.09548-	9126281803	93
1.43220-	17	1.17289-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126281803	94
4.00000-	1	9.00000-	1	0	0	0	0	0	0	0	2126281803	95
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	19126281803	96
5.26910-	1	2.11126+	0	1.96162-	1	6.86305-	1	1.46895-	1	3.41199-	1126281803	97
3.12873-	2	1.03651-	1	6.84173-	3	4.18967-	2	2.57752-	3	1.33669-	2126281803	98
5.46734-	4	3.64916-	3	1.49483-	4	9.46105-	4	1.66970-	5	2.41379-	4126281803	99
4.88521-	5	1.75641-	4	2.45609-	6	4.22245-	5	1.52541-	6	1.28860-	5126281803	100
3.12599-	7	3.63885-	6	6.32504-	8	4.14714-	6	5.90003-	8	8.66236-	7126281803	101
1.37149-	8	1.13614-	7	6.08118-	11	1.50045-	8	3.41440-	12	1.78598-	8126281803	102
2.75226-	11	7.35103-	10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126281803	103
9.00000-	1	1.15000+	0	2	0	0	0	0	0	0	3126281803	104
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	19126281803	105
1.05106-	1	1.70053+	0	5.98281-	2	5.97672-	1	2.28980-	2	1.11699-	1126281803	106
5.86919-	3	3.37099-	2	3.02614-	3	1.25887-	2	7.37095-	4	4.54185-	3126281803	107
1.38651-	4	1.13567-	3	9.31884-	5	6.15801-	4	1.91336-	5	2.08397-	4126281803	108
2.34910-	6	3.22186-	5	7.05070-	7	1.79362-	5	4.78540-	6	2.60335-	6126281803	109
3.77342-	9	7.32215-	7	1.02785-	9	5.49878-	7	2.28855-	11	1.71546-	7126281803	110
1.44932-	11	2.16636-	8	4.33608-	14	2.23759-	8	2.82405-	17	5.36277-	1126281803	111
5.04485-	18	2.77730-	11	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126281803	112
1.35000+	0	1.80000+	0	0	0	0	0	0	0	0	4126281803	113
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	14126281803	114
3.32479-	2	2.73515+	0	4.46984-	2	4.87561-	1	1.53202-	2	1.15763-	1126281803	115
5.41368-	3	3.49792-	2	2.93057-	3	1.56268-	2	7.54360-	4	7.67282-	3126281803	116
1.17996-	4	2.46018-	3	6.79717-	5	3.96956-	4	1.16056-	5	1.53525-	4126281803	117
2.08589-	6	4.07339-	5	6.87086-	8	6.35132-	7	8.32146-	12	2.51760-	8126281803	118
2.41599-	15	9.05109-	9	5.27716-	17	4.43663-	11	0.00000+	0	0.00000+	0126281803	119
1.80000+	0	2.20000+	0	0	0	0	0	0	0	0	5126281803	120
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	18126281803	121
1.37801-	2	1.43343+	0	5.35251-	3	2.96103-	1	3.40309-	3	1.27204-	1126281803	122
1.73103-	3	2.83300-	2	9.44486-	4	1.39569-	2	1.36912-	4	5.01941-	3126281803	123
6.37600-	5	9.49852-	4	1.47096-	5	5.52576-	4	4.92491-	6	1.98121-	4126281803	124
3.72281-	6	9.04012-	5	3.32471-	7	4.14675-	5	1.92021-	8	9.90620-	6126281803	125
1.05127-	8	2.35522-	6	2.11403-	10	6.27219-	7	9.22881-	12	3.25351-	8126281803	126
3.11842-	11	2.80343-	8	4.01780-	15	1.18259-	8	1.81828-	17	2.94831-	10126281803	127
2.20000+	0	2.60000+	0	0	0	0	0	0	0	0	6126281803	128
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	16126281803	129
2.50051-	2	1.28697+	0	8.75441-	3	2.63824-	1	5.16266-	3	9.75119-	2126281803	130
2.44169-	3	2.52449-	2	1.23109-	3	9.31485-	3	5.71229-	5	2.94643-	3126281803	131
2.12642-	5	4.13479-	4	7.36009-	6	1.46158-	4	1.90885-	6	6.88077-	5126281803	132
-3.43876-	9	9.04265-	6	4.18627-	10	1.19616-	6	2.86544-	9	6.66865-	7126281803	133
1.50572-	9	5.96339-	7	8.52373-	13	2.16747-	8	4.77990-	19	4.69100-	1126281803	134
1.76868-	17	5.36608-	12	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126281803	135
2.60000+	0	3.00000+	0	0	0	0	0	0	0	0	7126281803	136
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	15126281803	137
1.96407-	2	1.39816+	0	8.79956-	3	3.24869-	1	5.08760-	3	1.29099-	1126281803	138
1.86324-	3	3.83664-	2	8.11545-	4	1.47115-	2	2.64222-	4	7.66709-	3126281803	139
7.93700-	5	3.27213-	3	2.59054-	6	1.68207-	4	7.08430-	6	3.08298-	4126281803	140
3.24549-	7	7.54109-	5	1.29370-	10	1.19587-	6	1.01696-	10	6.62591-	7126281803	141
1.06436-	13	2.16685-	8	3.48545-	22	9.83700-	11	5.38863-	18	3.73610-	12126281803	142
3.00000+	0	4.00000+	0	0	0	0	0	0	0	0	8126281803	143
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	16126281803	144
1.32471-	2	1.41975+	0	5.85401-	3	3.29234-	1	4.00983-	3	1.27036-	1126281803	145
2.56201-	3	3.30429-	2	1.39542-	3	1.31015-	2	2.23585-	4	4.45143-	3126281803	146
2.91953-	5	1.50874-	3	6.11476-	6	5.14067-	4	1.40092-	6	1.40604-	4126281803	147
6.27413-	7	1.31276-	4	1.38711-	7	7.66330-	5	3.10267-	10	1.02300-	6126281803	148
1.92393-	11	5.98662-	7	1.29404-	16	1.01114-	7	1.93062-	18	1.79063-	1126281803	149
1.46024-	18	2.21301-	12	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126281803	150
4.00000+	0	5.00000+	0	0	0	0	0	0	0	0	9126281803	151
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	16126281803	152
1.09875-	2	1.34883+	0	3.76431-	3	2.62959-	1	2.95240-	3	1.24255-	1126281803	153
1.31773-	3	2.52327-	2	4.32764-	4	1.30568-	2	7.58001-	5	8.75530-	3126281803	154
1.70549-	4	4.05170-	3	1.57962-	6	1.21725-	3	7.89368-	8	3.47496-	4126281803	155

1.50389-	8	9.75343-	5	6.23427-	9	6.24248-	5	1.87093-10	1.04411-	6126281803	156	
2.03340-13		6.17242-	7	2.25972-16		1.72020-	7	1.31290-22	2.00000-	8126281803	157	
6.87217-24		2.39375-13		0.00000+	0	0.00000+	0	0.00000+	0.00000+	0126281803	158	
5.00000+	2	6.00000+	0	0	0	0	0	0	0	10126281803	159	
1.00000+	1	1.00000+	7	0	0	0	0	0	0	12126281803	160	
1.00000+	2	1.00000+	0	6.54462-	3	3.45830-	1	1.52776-	3	8.70199-	2126281803	161
1.52357-	4	1.67706-	2	2.04631-	5	5.11245-	3	6.42499-	0	3.20140-	3126281803	162
7.61545-	8	8.69636-	4	2.47229-	5	1.17448-	3	4.44115-13	2.43872-	4126281803	163	
2.15732-11		1.04218-	6	1.89161-14		5.90263-	7	9.99597-23	2.45830-	8126281803	164	
6.00000+	0	7.50000+	0	0	0	0	0	0	0	11126281803	165	
1.00000-	1	1.00000+	7	0	0	0	0	0	0	10126281803	166	
1.75170-	3	1.78026+	0	1.15398-	3	3.63993-	1	2.52907-	4	8.45266-	2126281803	167
1.38003-	5	1.36583-	2	6.48457-	7	8.49691-	3	1.91878-	7	1.53165-	3126281803	168
8.60087-12		9.64726-	4	8.92896-14		1.03916-	6	2.63164-15	6.05244-	7126281803	169	
6.32441-21		1.55885-	9	0.00000+	0	0.00000+	0	0.00000+	0.00000+	0126281803	170	
										126281	171	
										1262	172	
										0	173	
0.		0.		0		0		0		11126480802	1	
1.00000-	1	4.00000-	1	0		0		0		1126480802	2	
1.00000-	1	1.00000+	9	0		0		0		16126480802	3	
1.51520-	3	1.37216+	0	8.28648-	4	1.27219-	1	3.81848-	4	1.58019-	2126480802	4
4.82923-	5	2.31047-	3	2.72643-	5	7.68540-	4	7.01045-	6	3.96417-	4126480802	5
3.34766-	6	1.62355-	4	6.66177-	7	4.43033-	5	5.33139-	7	1.45949-	5126480802	6
1.03116-	7	4.26015-	6	2.86511-	8	1.03135-	6	4.67937-	9	4.63108-	7126480802	7
3.00912-	9	2.48649-	7	5.82984-10		7.86038-	8	4.75823-11	1.70574-	8126480802	8	
1.03176-11		8.52187-10		0.00000+	0	0.00000+	0	0.00000+	0.00000+	0126480802	9	
4.00000-	1	9.00000-	1	0		0		0		2126480802	10	
1.00000-	1	1.00000+	9	0		0		0		17126480802	11	
1.00129-	2	1.42215+	0	2.24530-	3	2.51811-	1	4.11135-	3	1.20100-	1126480802	12
1.94538-	3	1.81233-	2	2.55576-	4	4.22000-	3	1.13091-	4	1.19516-	3126480802	13
4.13869-	5	4.56191-	4	1.29300-	5	1.87159-	4	1.87301-	6	5.28654-	5126480802	14
1.45663-	6	1.83792-	5	3.66317-	7	6.06126-	6	3.51889-	8	8.99489-	7126480802	15
7.40031-	9	4.08754-	7	6.78442-10		3.23462-	7	1.06348-	9	8.00628-	8126480802	16
1.62868-10		1.98178-	8	5.19700-12		7.63802-10		0.00000+	0	0.00000+	0126480802	17
9.00000-	1	1.35000+	0	0		0		0		3126480802	18	
1.00000-	1	1.00000+	9	0		0		0		17126480802	19	
2.16755-	2	1.44884+	0	5.12548-	3	2.79765-	1	7.80359-	3	1.22001-	1126480802	20
3.22089-	3	1.95190-	2	3.69223-	4	4.68257-	3	1.39872-	4	1.32926-	3126480802	21
3.52762-	5	4.08969-	4	1.22334-	5	1.67526-	4	1.27662-	6	7.31064-	5126480802	22
1.49573-	6	2.93002-	5	1.00012-	7	6.11045-	6	1.01400-	8	1.10327-	6126480802	23
1.76330-	9	3.32517-	7	8.53121-10		2.60217-	7	5.98391-10	4.95692-	8126480802	24	
2.73646-10		1.94052-	8	5.67346-12		7.86607-10		0.00000+	0	0.00000+	0126480802	25
1.35000+	0	1.80000+	0	0		0		0		4126480802	26	
1.00000-	1	1.00000+	9	0		0		0		17126480802	27	
3.45321-	2	1.47516+	0	8.88618-	3	2.60270-	1	1.07152-	2	1.27154-	1126480802	28
4.19525-	3	2.09063-	2	4.42563-	4	4.46701-	3	1.39718-	4	1.02428-	3126480802	29
1.86643-	5	2.86359-	4	4.41573-	6	1.84640-	4	9.51260-	7	6.03701-	5126480802	30
1.11900-	6	3.08247-	5	1.00000+	7	9.58474-	6	5.08164-	9	1.50877-	6126480802	31
2.71882-10		3.16885-	7	1.63938-10		3.08140-	8	5.13671-10	2.42641-	8126480802	32	
1.51497-11		1.24954-	8	4.51176-12		7.54044-10		0.00000+	0	0.00000+	0126480802	33
1.80000+	0	2.20000+	0	0		0		0		5126480802	34	
1.00000-	1	1.00000+	9	0		0		0		16126480802	35	
3.74744-	2	1.53732+	0	9.60065-	3	3.19116-	1	1.29227-	2	1.33231-	1126480802	36
3.95548-	3	2.24473-	2	4.42255-	4	5.00738-	3	1.26387-	4	1.24015-	3126480802	37
1.35999-	5	2.79734-	4	6.72376-	6	5.45202-	4	4.84580-	7	3.58105-	5126480802	38
5.32917-	7	3.54974-	5	5.05537-	0	1.12566-	5	7.75392-10	1.27626-	6126480802	39	
1.00627-10		6.07899-	7	5.67226-10		2.008918-	8	2.55320-12	9.55173-	9126480802	40	
1.23524-12		7.48560-10		0.00000+	0	0.00000+	0	0.00000+	0.00000+	0126480802	41	
2.20000+	0	2.60000+	0	0		0		0		6126480802	42	
1.00000-	1	1.00000+	9	0		0		0		16126480802	43	
2.77459-	2	2.57636+	0	2.51679-	2	5.95191-	1	1.44242-	2	1.26202-	1126480802	44
3.30486-	3	2.24170-	2	5.17911-	4	5.49068-	3	9.70473-	5	1.16297-	3126480802	45
9.86007-	6	4.58324-	4	4.51617-	6	3.06246-	4	2.00155-	7	3.05789-	5126480802	46
5.67330-	7	4.26260-	5	1.65890-	8	1.11047-	5	8.52570-11	2.55424-	7126480802	47	
3.29834-10		2.36294-	6	7.55774-12		1.63724-	8	3.39814-11	2.36443-	8126480802	48	
7.61553-15		6.73652-10		0.00000+	0	0.00000+	0	0.00000+	0.00000+	0126480802	49	
2.60000+	0	3.00000+	0	0		0		0		7126480802	50	
1.00000-	1	1.00000+	9	0		0		0		15126480802	51	

3.72414-	2	1.57595+	0	1.02751-	2	5.18554-	1	1.44335-	2	1.37728-	1126480802	52
2.75822-	3	2.22776-	2	4.32489-	4	5.61691-	3	7.02665-	5	1.23784-	3126480802	53
1.39572-	5	5.72721-	4	1.38028-	6	3.43743-	4	5.77862-	8	3.94645-	5126480802	54
6.38635-	7	5.11039-	5	6.27083-	9	1.17524-	5	1.15546-10	1.07719-	6126480802	55	
1.64264-10	2.32279-	8	4.31924-12	1.65311-	8	5.14126-17	1.00000-	9126480802	56			
3.20200+	0	4.00200+	0	0	0	0	0	8126480802	57			
1.00402+	1	1.00100+	9	0	0	0	0	15126480802	58			
4.78771-	2	2.58547+	0	4.34899-	2	6.40920+	1	2.08763-	2	1.30640-	1126480802	59
3.67583-	3	2.13151-	2	6.09773-	4	6.40119-	3	1.04437-	4	1.60053-	3126480802	60
1.89421-	5	6.11562-	4	2.27132-	7	6.74126-	4	4.00605-	7	7.01519-	5126480802	61
6.77823-	7	6.51622-	5	4.72546-	9	1.05291-	5	1.13418-10	7.94314-	7126480802	62	
2.05920-13	6.46805-	7	4.17731-11	2.17147-	8	2.90672-17	2.97986-	10126480802	63			
4.00400+	0	5.00000+	0	0	0	0	0	9126480802	64			
1.00400+	1	1.00400+	9	0	0	0	0	14126480802	65			
2.00400+	2	1.87709+	0	8.56555-	3	6.32676-	1	1.20413-	2	1.50006-	1126480802	66
1.05668-	3	2.02650-	2	2.56504-	4	9.05211-	3	2.12940-	5	2.71694-	3126480802	67
5.37515-	7	5.60072-	4	1.94668-	8	1.53248-	4	2.66584-	7	6.90789-	5126480802	68
-5.30435-10	7.53547-	5	1.90580-11	1.03762-	6	2.87114-16	1.79544-	7126480802	69			
1.40000-16	7.19590-12	2.46078-18	7.18320-13	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480802	70
5.00000+	0	6.00000+	0	0	0	0	0	10126480802	71			
1.00000+	1	1.00000+	9	0	0	0	0	13126480802	72			
1.19566-	2	1.87841+	0	3.30170-	3	5.03159-	1	6.10431-	3	1.55015-	1126480802	73
2.69424-	4	3.24962-	2	1.00246-	4	1.20093-	2	7.04297-	6	4.47406-	3126480802	74
1.62689-	7	1.34414-	3	4.95008-	9	6.85689-	5	8.75369-14	1.22980-	6126480802	75	
2.63581-12	1.03353-	6	1.53810-18	1.55652-	7	6.24351-21	7.46290-	12126480802	76			
6.19234-20	2.04382-12	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480802	77
6.00000+	0	7.50000+	0	0	0	0	0	11126480802	78			
1.00000+	1	1.00000+	7	0	0	0	0	11126480802	79			
5.65718-	3	1.60372+	0	9.73995-	4	4.12405-	1	2.11320-	3	1.65144-	1126480802	80
2.67929-	4	6.85444-	2	1.52465-	5	1.41366-	2	3.71382-	7	5.14886-	3126480802	81
5.26719-	9	1.49507-	3	2.02328-10	8.31972-	4	2.03401-14	9.17090-	4126480802	82		
5.99126-14	1.03766-	6	2.05070-20	5.86991-	8	0.00000+	0	0.00000+	0	0.00000+	0126480802	83
0.	0.	0.	0	0	0	0	0	126480	0		84	
1.00000-	1	4.00000-	1	0	0	0	0	11126480803	85			
1.00000-	1	1.00000+	9	0	0	0	0	1126480803	86			
1.67273-	2	2.29107+	0	1.66008-	3	8.97830-	1	9.67546-	3	5.96817-	1126480803	88
5.95517-	3	1.34321-	1	1.81682-	3	5.52554-	2	9.76668-	4	1.71601-	2126480803	89
1.19397-	4	3.95301-	3	5.28369-	5	6.70283-	4	1.92828-	5	5.31679-	4126480803	90
5.73481-	6	2.15703-	4	9.69922-	8	1.19946-	5	3.59483-	7	1.40689-	5126480803	91
8.91766-	8	2.88749-	6	1.43142-	8	8.52413-	7	1.27377-	9	2.65480-	7126480803	92
1.44556-11	2.80274-	8	1.21362-12	2.25502-	8	2.68642-13	8.09492-	9126480803	93			
3.86392-17	1.11927-10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	94
4.00000-	1	0.00000-	1	0	0	0	0	2126480803	95			
1.00000-	1	1.00000+	9	0	0	0	0	19126480803	96			
1.03631-	1	2.78069+	0	2.00064-	2	8.96753-	1	7.23595-	2	5.41161-	1126480803	97
2.50547-	2	1.64704-	1	5.60799-	3	5.89620-	2	2.08150-	3	1.63620-	2126480803	98
5.59560-	4	4.48761-	3	1.63013-	4	9.47396-	4	2.03364-	5	3.35964-	4126480803	99
4.92001-	5	1.81557-	4	2.05059-	6	3.85392-	5	1.58735-	6	1.22766-	5126480803	100
2.87632-	7	3.11840-	6	5.64685-	8	4.80504-	6	5.14641-	8	7.88215-	7126480803	101
1.26341-	8	1.07459-	7	6.33332-11	1.00296-	8	4.68522-15	6.22488-	8126480803	102		
2.92057-11	7.10824-10	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	103
9.00000-	1	1.55000+	0	0	0	0	0	3126480803	104			
1.00000-	1	1.00000+	9	0	0	0	0	19126480803	105			
2.12176-	2	1.97832+	0	7.77144-	3	6.28700-	1	1.16178-	2	2.02977-	1126480803	106
6.10248-	3	6.21840-	2	2.72779-	3	1.58014-	2	5.90055-	4	5.67204-	3126480803	107
1.18777-	4	1.52547-	3	1.01579-	4	0.38315-	4	2.00291-	5	2.10015-	4126480803	108
2.14042-	6	3.97404-	5	6.68804-	7	1.78639-	5	5.09027-	8	2.79144-	6126480803	109
6.15193-	9	7.20477-	7	9.21518-10	6.17023-	7	1.43080-11	1.00616-	7126480803	110		
1.93310-	11	2.14163-	8	2.81505-12	2.34548-	8	8.81528-17	4.32278-	1126480803	111		
3.38170-16	1.42050-11	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	112
1.35000+	0	1.80000+	0	0	0	0	0	4126480803	113			
1.00000-	1	1.00000+	9	0	0	0	0	14126480803	114			
7.39893-	3	2.62032+	0	7.14888-	3	5.69664-	1	5.35551-	3	1.78300-	1126480803	115
4.30469-	3	6.32812-	2	2.69516-	3	1.79253-	2	7.15780-	4	8.07336-	3126480803	116
9.21053-	5	2.15623-	3	6.02749-	5	4.03454-	4	9.89939-	6	1.57134-	4126480803	117
2.04223-	6	3.90244-	5	6.88400-	8	6.35759-	7	8.45161-12	2.41681-	8126480803	118	
1.09583-15	6.33652-	9	1.42691-16	3.40069-11	0.00000+	0	0.00000+	0	0.00000+	0	0126480803	119
1.80000+	0	2.00000+	0	0	0	0	0	5126480803	120			

1.83000-	1	1.83000+	9	0	0	0	0	18126480803	121			
2.89863-	3	1.52577+	0	6.57198-	4	3.29237-	1	1,24121-	3	1,91651-	1126480803	122
1.89288-	3	5.55379-	2	9.86642-	4	1.60742-	2	1,39917-	4	6.18555-	3126480803	123
6.57845-	5	7.56878-	4	4.89346-	5	4.56740-	4	6.15332-	6	2,26552-	4126480803	124
3.22414-	6	1.02227-	4	3.15523-	7	4.31518-	5	1,99951-	8	8.81178-	6126480803	125
1.74254-	8	2.35417-	6	3.32537-12	5.32922-	7-1.01008-	11	2,92972-	8126480803	126		
2.93498-11	2.76033-	9	6.46331-15	1.22794-	8	5.05407-17	2,96275-1	0126480803	127			
2.23112+	0	2.60000+	0	0	0	0	0	6126480803	128			
1.00000-	1	1.23400+	9	0	0	0	0	13126480803	129			
5.61566-	3	1.33510+	0	3.83267-	3	1.37989-	1	1.70632-	3	2.13414-	2126480803	130
4.22513-	4	7.52495-	3	2.14155-	5	4.17945-	4	1.43048-	6	4,21932-	4126480803	131
5.61841-	6	9.85074-	5	8.93048-	8	9.77286-	5	1,93329-	9	7,70247-	7126480803	132
2.77722-	9	6.03331-	7	8.92693-13	2.30374-	8	4,54075-13	2,03019-	8126480803	133		
5.23360-17	9.84050-13	2.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	134
2.64420+	0	3.33333+	0	0	0	0	0	0	0	0	7126480803	135
1.02400-	1	1.00000+	9	0	0	0	0	0	0	0	15126480803	136
4.02441-	3	1.61870+	0	1.05113-	3	4.72756-	1	2,17936-	3	1,75843-	1126480803	137
1.27079-	3	5.95966-	2	7.52267-	4	1,94178-	2	2,21919-	4	9,87965-	3126480803	138
6.52472-	5	3.18742-	3	2.16426-	5	1.72918-	4	6.16318-	6	3,15688-	4126480803	139
2.11232-	7	7.11792-	5	9.94987-11	1.26840-	6	1,00134-10	6,56296-	7126480803	140		
1.61518-13	2.15580-	8	1.78360-19	1.22962-11	1,46873-17	1,22887-12	12126480803	141				
3.22112+	0	4.22200+	0	0	0	0	0	0	0	0	8126480803	142
1.00000-	1	1.00000+	9	0	0	0	0	0	0	0	16126480803	143
2.13116-	3	2.40880+	0	1,94059-	3	4,39860-	1	9,42593-	4	1,99852-	1126480803	144
1.00225-	3	5.23980-	2	1,19143-	3	1,42400-	2	1,59598-	4	4,72552-	3126480803	145
2.56339-	5	1.55880-	3	6.12916-	6	5,33233-	4	1,42134-	6	1,32740-	4126480803	146
4.31043-	7	1.28976-	4	1,14614-	7	8,12500-	5	2,31118-10	1,03600-	6126480803	147	
2.54040-11	6.15590-	7	1,55012-15	1,36730-	7	5,95081-18	4,42500-	12126480803	148			
3.37495-18	5.46850-13	2.20000+	0	0.22000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	149
4.00000+	0	5.20000+	0	0	0	0	0	0	0	0	9126480803	150
1.00000-	1	1.22200+	9	0	0	0	0	0	0	0	16126480803	151
1.43917-	3	2.70852+	0	1,32695-	3	6,43599-	1	1,22299-	3	1,86301-	1126480803	152
9.22539-	4	5.26222-	2	5,89351-	4	1,43259-	2	4,89011-	5	1,31195-	2126480803	153
1.00980-	4	3.96821-	3	1,47296-	6	9,50211-	4	3,31000-	8	3,94246-	4126480803	154
1.51179-	8	1.04781-	4	5,21701-	9	6,92928-	5	1,42502-10	1,03184-	6126480803	155	
2.11107-13	4.07527-	7	1,13291-16	1,62875-	7	1,18450-22	7,70040-	8126480803	156			
1.89738-19	7.13150-14	2.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0126480803	157
5.30000+	0	6.00000+	0	0	0	0	0	0	0	0	10126480803	158
1.00000-	1	1.00000+	7	0	0	0	0	0	0	0	12126480803	159
2.52938-	3	1.61372+	0	8,95921-	4	3,25133-	1	9,57559-	4	1,30443-	1126480803	160
1.16917-	4	1,93860-	2	1,07947-	5	5,76564-	3	5,82431-	6	3,32740-	3126480803	161
7.47639-	6	8,70382-	4	2,14530-	8	1,10014-	3	6,28010-16	9,49798-	4126480803	162	
1.62835-11	9.91546-	7	1,12598-12	5,53587-	7	9,99562-22	1,23214-	8126480803	163			
6.00000+	0	7.50000+	0	0	0	0	0	0	0	0	11126480803	164
1.00000-	1	1.00000+	7	0	0	0	0	0	0	0	11126480803	165
4.28252-	4	1,56820+	0	7,42751-	5	5,28214-	1	2,19076-	4	1,61246-	1126480803	166
1.42071-	5	3,79475-	2	4,51219-	6	1,25942-	2	1,50577-	6	1,00288-	2126480803	167
2.67369-	9	1,55458-	3	6,53115-14	1,87084-	4-1,87985-13	7,98939-	7126480803	168			
6.37619-13	6.30326-	7	9,44349-16	1,80848-	7	2,00000+	0	0.00000+	0	0126480803	169	
									126480	0	170	
									1264	0	171	
									0	0	172	
0.	0.	0.	0	0	0	0	0	11129681802	1			
1.00000-	1	4.00000-	1	0	0	0	0	1129681802	2			
1.00000-	1	1.00000+	9	0	0	0	0	16129681802	3			
4.57936-	3	1,41293+	0	2,01568-	3	1,50306-	1	6,46628-	4	1,92261-	2129681802	4
6.19859-	5	3,05080-	3	3,05907-	5	1,08060-	3	8,58263-	6	3,91227-	4129681802	5
4.03743-	6	1,38033-	4	8,39213-	7	4,19515-	5	4,89821-	7	1,62210-	5129681802	6
3.99498-	8	5,39092-	6	2,92526-	8	1,32421-	6	8,75331-	9	4,73727-	7129681802	7
4.14256-	9	2,27947-	7	8,36457-10	7,22219-	8	5,93926-11	1,49243-	8129681802	8		
2.02716-11	8,34997-10	2.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0129681802	9	
4.20400-	1	9.00000-	1	0	0	0	0	0	0	0	2129681802	10
1.00000-	1	1.00000+	7	0	0	0	0	0	0	0	17129681802	11
2.70681-	2	1,75110+	0	1,25821-	2	3,62955-	1	6,70443-	3	9,72174-	2129681802	12
3.21672-	3	1,95608-	2	3,20899-	4	3,74446-	3	1,05774-	4	1,36151-	3129681802	13
3.53624-	5	4,73607-	4	1,37447-	5	1,66721-	4	2,13623-	6	4,42893-	5129681802	14
1.49834-	6	1,74859-	5	1,44013-	7	6,68634-	6	5,43088-	8	1,41296-	6129681802	15

1.04846-	8	3.57432-	7	6.08704-	9	1.88943-	7	1.54047-	9	7.57545-	8129681802	16
1.52961-10		2.01288-	8	1.77142-11		8.16468-10		0.00000+	0	0.00000+	0129681802	17
0.20000-	1	1.55000+	0		0		0		0		3129681802	18
1.00000-	1	1.00000+	9		0		0		0		17129681802	19
5.93974-	2	1.76234+	0	2.48471-	2	3.74639-	1	1.34222-	2	1.08991-	1129681802	20
5.18892-	3	2.05104-	2	4.60645-	4	4.24280-	3	1.24774-	4	1.42285-	3129681802	21
4.26057-	5	4.56748-	4	1.48179-	5	1.74792-	4	2.92006-	6	5.34068-	5129681802	22
1.50726-	6	2.31299-	5	1.01174-	7	7.96423-	6	1.25406-	8	1.32158-	6129681802	23
4.37645-	9	2.23761-	7	1.60727-	9	1.20417-	7	6.78687-10		4.36636-	8129681802	24
1.97028-10		1.93228-	8	2.17181-11		7.83411-10		0.00000+	0	0.00000+	0129681802	25
1.35002+	0	1.80000+	0		0		0		0		4129681802	26
1.00000-	1	1.00000+	9		0		0		0		17129681802	27
0.88320-	2	1.83720+	0	4.22751-	2	3.98680-	1	1.93469-	2	1.14124-	1129681802	28
6.52324-	3	2.13761-	2	4.60550-	4	4.58269-	3	1.45895-	4	1.49459-	3129681802	29
4.27295-	5	4.61804-	4	1.30324-	5	1.69709-	4	1.76683-	6	4.74401-	5129681802	30
1.67704-	6	2.77011-	5	7.90722-	8	1.11247-	5	3.72433-	9	1.61815-	6129681802	31
5.65858-10		3.24103-	7	2.97839-10		3.53259-	8	4.75454-10		2.58066-	8129681802	32
3.47701-10		3.18083-	8	1.79689-11		7.80287-10		0.00000+	0	0.00000+	0129681802	33
1.82722+	0	2.20000+	0		0		0		0		5129681802	34
1.00000-	1	1.00000+	9		0		0		0		16129681802	35
1.03290-	1	1.86749+	0	4.44396-	2	4.29470-	1	2.29205-	2	1.22229-	1129681802	36
5.84621-	3	2.23230-	2	4.79737-	4	4.90119-	3	1.02927-	4	1.59399-	3129681802	37
3.89764-	5	5.21673-	4	7.02425-	6	1.68510-	4	1.38864-	6	4.60997-	5129681802	38
1.15466-	6	3.16276-	5	8.86112-	8	1.29665-	5	4.37054-10		1.08090-	6129681802	39
1.12239-11		4.71536-	8	5.85272-10		2.80094-	8	6.82189-15		2.37744-	9129681802	40
4.97451-12		7.02128-10		0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0129681802	41
2.22320+	0	2.60000+	0		0		0		0		6129681802	42
1.00000-	1	1.00000+	9		0		0		0		16129681802	43
1.11323-	1	1.87437+	0	4.61858-	2	4.53805-	1	2.63442-	2	1.35453-	1129681802	44
5.59879-	3	2.42262-	2	5.26593-	4	5.51678-	3	9.32899-	5	1.70055-	3129681802	45
3.21622-	5	5.50198-	4	4.46552-	6	1.66758-	4	7.63784-	7	4.82299-	5129681802	46
1.29237-	6	3.76700-	5	4.77537-	8	1.42569-	5	1.40644-10		2.96424-	8129681802	47
1.24416-10		2.72532-	8	3.40357-11		2.78271-	8	3.19147-11		2.56858-	8129681802	48
3.29544-14		7.89478-10		0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0129681802	49
2.62000+	0	3.00000+	0		0		0		0		7129681802	50
1.00000-	1	1.00000+	9		0		0		0		15129681802	51
1.01033-	1	1.99816+	0	5.20837-	2	4.96799-	1	2.43232-	2	1.29902-	1129681802	52
4.61098-	3	2.42339-	2	4.96098-	4	5.79669-	3	7.26757-	5	1.80235-	3129681802	53
2.97493-	5	5.93167-	4	1.37521-	6	1.31516-	4	7.81538-	7	6.40569-	5129681802	54
1.34527-	6	4.79926-	5	8.02483-	9	1.32563-	5	4.34955-11		3.24965-	6129681802	55
6.29861-11		2.82888-	8	3.82198-12		2.39102-	8	1.84505-17		1.27640-	9129681802	56
3.00000+	0	4.00000+	0		0		0		0		8129681802	57
1.00000-	1	1.00000+	9		0		0		0		15129681802	58
1.63535-	1	2.61707+	0	1.28394-	1	5.05378-	1	3.59738-	2	1.05879-	1129681802	59
6.16752-	3	2.28199-	2	9.58122-	4	6.36582-	3	1.18263-	4	1.86514-	3129681802	60
3.11683-	5	6.00000+	4	2.59684-	5	6.99744-	5	2.79521-	7	6.90136-	5129681802	61
1.52668-	6	6.54701-	5	1.25727-	8	1.42418-	5	7.39312-12		1.26574-	6129681802	62
4.06460-14		3.00952-	7	4.40932-13		2.21333-	8	8.49384-18		3.81265-10	1129681802	63
4.00000+	0	5.00000+	0		0		0		0		9129681802	64
1.00000-	1	1.00000+	9		0		0		0		14129681802	65
6.79765-	2	2.71128+	0	5.41011-	2	5.14824-	1	2.47509-	2	1.21306-	1129681802	66
2.35525-	3	2.46201-	2	4.30295-	4	8.11014-	3	3.61006-	5	3.01364-	3129681802	67
1.18480-	6	5.34153-	4	4.14300-	7	6.41636-	5	1.00708-	6	7.22842-	5129681802	68
4.78207-	9	7.23151-	5	7.93591-13		1.04987-	6	6.48490-16		1.79138-	7129681802	69
5.28244-19		2.16883-11		6.54327-19		7.03245-13		0.00000+	0	0.00000+	0129681802	70
5.00000+	0	6.00000+	0		0		0		0		10129681802	71
1.00000-	1	1.00000+	9		0		0		0		13129681802	72
4.24126-	2	1.69877+	0	1.64049-	2	2.98114-	1	1.04532-	2	1.12123-	1129681802	73
6.75477-	4	2.80257-	2	1.62514-	4	1.09155-	2	1.68557-	5	4.27432-	3129681802	74
2.77764-	7	2.36536-	3	2.59924-	8	6.86112-	5	3.20931-14		1.22232-	6129681802	75
7.72785-14		9.96913-	7	9.15021-18		1.73032-	7	6.86056-21		2.48196-11	1129681802	76
1.15699-20		6.94295-13		0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0129681802	77
6.00000+	0	7.50000+	0		0		0		0		11129681802	78
1.00000-	1	1.00000+	9		0		0		0		11129681802	79
1.83492-	2	1.70393+	0	6.60448-	3	3.30171-	1	4.45528-	3	1.20398-	1129681802	80
2.17670-	4	4.50457-	2	3.27137-	5	1.40288-	2	7.38277-	7	4.97407-	3129681802	81
7.70680-	9	1.83977-	3	3.26129-10		8.25314-	4	1.66341-13		2.60513-	4129681802	82
2.34462-15		1.03613-	6	2.50144-22		1.63206-	7	0.00000+	0	0.00000+	0129681802	83
											129681	84

0.	0.	0	0	0	0	11129681803	85
1.00000-1	4.00000-1	0	0	0	0	1129681803	86
1.00000-1	1.00000+9	0	0	0	0	19129681803	87
6.89434-2	1.82056+0	1.75749-2	4.42436-1	1.79624-2	3.15735-2	1129681803	88
8.32862-3	8.21851-2	1.56763-3	3.09693-2	8.80714-4	1.52913-4	2129681803	89
1.08019-4	4.08730-3	4.07418-5	9.15304-4	2.26294-5	6.63367-5	4129681803	90
6.16562-6	2.18661-4	1.06044-7	2.10246-5	3.10642-7	1.41375-7	5129681803	91
5.64193-8	3.59046-6	1.18292-8	8.13862-7	1.53176-9	2.58370-9	7129681803	92
3.34897-11	2.82396-8	1.39089-12	1.99297-8	9.31669-14	8.89492-14	9129681803	93
1.10218-17	1.19164-10	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0129681803	94
4.00000-1	9.00000-1	0	0	0	0	2129681803	95
1.00000-1	1.00000+7	0	0	0	0	19129681803	96
4.22820-1	2.10816+0	1.11571-1	6.58651-1	1.18296-1	3.25994-1	1129681803	97
2.69752-2	1.07296-1	6.59664-3	3.60240-2	1.80204-3	1.29727-3	2129681803	98
7.09914-4	3.74172-3	1.23783-4	1.06440-3	1.43194-5	3.08336-5	4129681803	99
4.94374-5	1.83772-4	1.92624-6	4.55693-5	1.54430-6	1.30698-6	5129681803	100
1.10710-7	3.68260-6	3.37506-8	3.10579-6	6.95776-8	1.18609-8	6129681803	101
1.12169-8	1.14540-7	1.71843-11	1.99837-8	8.34489-12	2.27629-12	8129681803	102
3.13287-11	7.35785-10	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0129681803	103
9.00000-1	1.35000+0	0	0	0	0	3129681803	104
1.00000-1	1.00000+9	0	0	0	0	19129681803	105
8.82611-2	1.89021+0	4.79426-2	3.26569-1	1.99948-2	1.15926-2	1129681803	106
6.57171-3	3.26515-2	2.78555-3	1.36895-2	5.65112-4	4.80501-4	3129681803	107
1.78337-4	9.85003-4	9.28013-5	5.85449-4	1.79460-5	2.10580-5	4129681803	108
2.43757-6	3.69557-5	6.94203-7	1.76903-5	2.77845-8	2.54538-8	6129681803	109
2.91426-9	6.58740-7	1.07936-9	6.11638-7	4.52414-11	2.22774-11	7129681803	110
4.50827-13	3.42242-8	8.88773-14	1.98529-8	1.93785-17	1.69380-17	1129681803	111
4.57749-18	1.66638-11	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0129681803	112
1.35000+0	1.80000+0	0	0	0	0	4129681803	113
1.00000-1	1.00000+9	0	0	0	0	14129681803	114
2.59581-2	2.72284+0	3.76412-2	4.63823-1	1.42129-2	1.21589-2	1129681803	115
7.10408-3	3.45432-2	3.50375-3	1.40187-2	1.01534-3	6.35400-3	3129681803	116
4.26521-5	4.46698-3	8.31980-5	3.70601-4	7.41766-6	7.87959-6	5129681803	117
3.46411-6	4.90359-5	8.58748-8	6.26207-7	1.06890-11	2.80066-11	6129681803	118
1.78502-17	2.80067-8	3.82067-17	1.36227-11	0.00000+0	0.00000+0	0129681803	119
1.80000+0	2.20000+0	0	0	0	0	5129681803	120
1.00000-1	1.00000+9	0	0	0	0	18129681803	121
1.02641-2	1.43417+0	5.49348-3	3.12535-1	3.27115-3	1.16749-3	1129681803	122
1.95914-3	2.84893-2	1.08775-3	1.32314-2	1.21183-4	4.07414-4	3129681803	123
7.22380-5	7.11862-4	7.97283-6	5.56282-4	7.02073-6	1.16591-6	4129681803	124
3.87177-6	7.07329-5	4.46273-7	3.82109-5	1.70934-8	1.37256-8	5129681803	125
6.30656-9	2.56804-6	5.84567-11	7.53693-7	6.28261-12	9.49260-12	8129681803	126
4.02356-11	2.81962-8	2.19957-16	2.97386-8	1.11162-17	9.74859-17	1129681803	127
2.20000+0	2.60000+0	0	0	0	0	6129681803	128
1.00000-1	1.00000+9	0	0	0	0	16129681803	129
1.63652-2	1.60529+0	1.19676-2	3.31730-1	5.84222-3	8.66136-3	2129681803	130
3.08142-3	3.19146-2	6.72854-4	8.42109-3	4.77249-5	1.58489-5	3129681803	131
2.94421-5	3.12173-4	7.53301-6	7.46752-5	3.15826-6	6.55706-6	5129681803	132
3.04424-9	5.46552-6	9.24803-10	6.01924-7	3.12416-9	6.67984-9	7129681803	133
1.59106-9	5.97900-7	1.49186-14	2.23878-8	3.11605-20	9.38202-20	1129681803	134
1.36267-17	1.08319-11	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0129681803	135
2.62420+0	3.00000+0	0	0	0	0	7129681803	136
1.00000-1	1.00000+9	0	0	0	0	15129681803	137
1.01104-2	2.70385+0	1.43796-2	4.52984-1	5.27646-3	1.17594-3	1129681803	138
1.91182-3	4.03913-2	1.11924-3	1.37541-2	1.72261-4	7.43556-4	3129681803	139
9.14350-5	2.98337-3	4.03110-6	1.82696-4	8.71789-6	3.70106-6	4129681803	140
6.20691-7	7.07612-5	5.19358-11	6.27173-7	4.63066-11	6.25146-11	7129681803	141
1.75777-15	2.17128-8	1.78360-24	2.45928-11	4.00728-18	2.33789-18	2129681803	142
3.00000+0	4.00000+0	0	0	0	0	8129681803	143
1.00000-1	1.00000+9	0	0	0	0	16129681803	144
6.71745-3	2.75492+0	9.48800-3	4.72103-1	4.16736-3	1.22448-3	1129681803	145
3.22394-3	3.12021-2	1.13289-3	9.75701-3	3.71700-4	4.00924-4	3129681803	146
3.09868-5	1.36580-3	9.40002-6	3.71200-4	2.73865-6	1.62437-6	4129681803	147
2.39705-7	8.68151-5	2.40287-7	7.42730-5	2.66404-11	7.09508-11	7129681803	148
1.46425-11	5.76721-7	4.13482-17	6.49378-8	1.00789-18	1.43143-18	1129681803	149
1.53248-18	1.28915-12	0.00000+0	0.00000+0	0.00000+0	0.00000+0	0129681803	150
4.00000+0	5.00000+0	0	0	0	0	9129681803	151
1.00000-1	1.00000+9	0	0	0	0	16129681803	152
8.36778-3	1.39342+0	3.59519-3	2.73349-1	2.57283-3	1.36271-3	1129681803	153

1.64425-	3	3.26432-	2	6.32586-	4	8.67498-	3	1.71964-	4	4.48785-	3129681803	154
1.65977-	4	3.95929-	3	3.83334-	6	1.07777-	3	1.95496-	7	3.35828-	4129681803	155
3.69245-	6	7.88971-	5	8.84167-	9	5.94478-	5	5.45819-12	1.05237-	6129681803	156	
1.82547-14	5.75028-	7	4.97833-16	1.71894-	7	8.11248-20	4.00000-	8129681803	157			
5.15442-24	1.21066-13	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0	0.00000+	0129681803	158
5.00000+	0	6.00000+	0	0	0	0	0	0	0	0	10129681803	159
1.00000-	1	1.00000+	7	0	0	0	0	0	0	0	12129681803	160
9.06709-	3	1.54310+	0	4.67205-	3	2.66182-	1	1.49543-	3	1.03914-	1129681803	161
2.43663-	4	1.38061-	2	5.03207-	5	4.77039-	3	6.40819-	6	3.11276-	3129681803	162
7.13734-	8	8.66134-	4	6.42245-	9	7.03013-	4	7.15931-13	9.74764-	5129681803	163	
6.19302-13	1.06165-	6	1.91366-14	7.53108-	7	1.08254-25	1.95064-	7129681803	164			
6.00000+	0	7.50000+	0	0	0	0	0	0	0	0	11129681803	165
1.70000-	1	1.00000+	7	0	0	0	0	0	0	0	11129681803	166
1.40319-	3	1.77094+	0	5.58437-	4	3.94210-	1	5.25535-	4	1.79184-	1129681803	167
9.32001-	5	8.68225-	2	3.56183-	5	1.27709-	2	6.76887-10	1.76786-	3129681803	168	
3.09687-13	3.98051-	4	2.54909-14	3.42285-	5	4.28676-16	2.11576-	6129681803	169			
2.71249-15	8.64500-	7	1.79266-18	1.00334-	7	0.00000+	0	0.00000+	0	0.00000+	0129681803	170
											129681	0 171
											1296	% 0 172
											0 0	0 173
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APPENDIX D

BASIC DECAY ENERGY FUNCTIONS, TERMINOLOGY, AND UNITS

This appendix summarizes the conceptual basis and equations of this report for those readers who feel a need for additional detail.

I. BASIC EQUATIONS IN ABSENCE OF NEUTRON ABSORPTION EFFECTS

During the fission process, the fission products are generated directly by fission and by decay or neutron absorption from precursors; absorption and decay also transmutes each product. Summation codes account for all simultaneous processes for each product, including the continuing decay following the end of the fission interval.

The buildup and decay processes are continuous, and summation codes necessarily provide information at specified time intervals. The basic libraries described in this report provide the aggregate summation spectra following a fission pulse in a multigroup format at two or more points per time decade out to 10^9 s ($\approx 2.778 \times 10^5$ h ≈ 31.7 yr). Collapsing the fine-energy multigroups to a reduced, but still multigroup, set and fitting each group to a single functional form results in a practical but still accurate description of the group decay energies at any decay or "cooling" time. These can be used as Green's functions to provide the decay energies subsequent to specified power (fission) histories.

Because the fits are to pulse decay data, the functions do not account for changes in the ensemble of products due to neutron absorption. Absorption alters the decay energies, particularly at long ($\geq 10^4$ s) cooling times. The effect depends on the magnitude and spectra of the neutron flux, and on the length of the fission history. As described in Sec. V of this report, neutron absorption effects can be accounted for to good approximation in a relatively simple way. In general, absorption decreases the density, hence also the decay energy of some products, and increases the density of others. The net effect, the one of interest here, tends to be an increase in decay energy, depending on the decay group. At some long cooling times, the net effect is very significant but is due to only a very few nuclides -- primarily the shielded nuclides, which are generated only by absorption, and certain nuclides associated with ^{135}Xe and ^{148}Pm .

The following equations apply only in the absence of neutron absorption; for long irradiation times and large neutron fluxes, these must be corrected at long cooling times as described in this appendix and in Sec. V. For simplicity of exposition, subscripts for the decay group and fissioning nuclide are ignored; group results must be summed over each fissioning nuclide. In addition, decay energies can be presented in four related ways: (1) gamma (beta) energy/s, (2) gammas (betas)/s, (3) gamma (beta) energy/fission, or (4) gammas (betas)/fission. Presentation on a per fission basis is preferable in that it eliminates the actual fission rate and is, for example, independent of the reactor power level. However, this is only possible for a constant fission rate prior to cooling. For broad multigrouping, it is also preferable to use the actual energy release per second or per fission rather than multiplicities, because the latter requires a specification of the average energy per group, which is not necessarily well approximated by, for example, the midpoint of the group energy.

We have specified energies in MeV units. The relation between MeV/fiss and MeV/s is

$$\text{MeV/fiss} \equiv \frac{\text{MeV/s}}{\text{fiss/s}}, \quad (\text{D1})$$

where the numerator is the energy release rate during the cooling time, and the denominator is the fission rate prior to cooling. Let

fiss $\equiv$ total number of fissions prior to the beginning of the cooling time,

$S(t') \equiv$ fission rate (per second) during the fission interval,

$f(t) \equiv$ MeV/fiss/s at t seconds following a fission pulse (that is, the release rate in MeV/s normalized to the number of fissions during the pulse),

$F(t,T) \equiv$ MeV/fiss at t seconds following a constant fission rate of T seconds,

$H(t,T) \equiv$ MeV/s at t seconds following a fission interval of T seconds.

Then

$$\text{fiss} = \int_0^T S(t') dt' \quad . \quad (D2)$$

If $S(t')$ is a constant $= S$, then

$$F(t,T) = \frac{H(t,T)}{S} \left[\frac{\text{MeV/s}}{\text{Fiss/s}} = \frac{\text{MeV}}{\text{Fiss}} \right] . \quad (D3)$$

All quantities are computed on some arbitrary unit volume.

Here we are using $f(t)$, $F(t,T)$, etc., to represent quantities calculated by summation codes or approximations obtained from fitted functions. The actual quantities can be accurately fitted to several functional forms. In this report we have used a linear sum of exponentials

$$f(t) = \sum_{i=1}^N \alpha_i e^{-\lambda_i t} \quad (\text{MeV/fiss/s}) \quad . \quad (D4)$$

The number of exponentials N required for a specified accuracy of fit depends on the total time over which $f(t)$ is to be used and on the energy group. However, the number is minimized by use of a nonlinear least-squares fit to the α_i , λ_i parameters. For example, an extreme case is the fit achieved to the total beta plus gamma energy release rate over a very long cooling time -- 23 exponentials have been used to achieve fits well within 1% out to $> 300\,000$ yr.*

* The pulse fits are based on 6 points per time decade from $0.1-10^{13}$ s and form the bases of the 1978 ANS 5 decay-heat standard.

The multigroup spectra, which do not require such accuracy, use fewer exponentials. In addition, when the pulse fits are folded into an extended fission interval, the resulting accuracy is further improved.

In practice, the pulse values were obtained from the summation code using 10^{-4} s as the irradiation time. The code normally provides $F(t,T)$ and $H(t,T)$. Therefore, the pulse data $f(T)$ is obtained from $f(t) = \frac{F(t,T)}{T} = F(t,T) \times 10^4$. The use of 10^{-4} s for the pulse is arbitrary; for times $< 10^{-2}$ s, the value of $f(t)$ does not change. This is to be expected because the fission product half-lives are long compared to such short irradiation times.

The value of the fitted pulse function is that, once obtained, it can be used to produce $F(t,T)$, the energy release rate at t seconds following any finite fission period T .

$$F(t,T) = \int_0^T f(t+T-t')dt' \quad (\text{MeV/fiss}) \quad , \quad (D5)$$

or changing variables,

$$F(t,T) = \int_t^{t+T} f(t')dt' \quad (\text{MeV/fiss}) \quad . \quad (D6)$$

Using the fitted form [Eq. (D4)], this results in

$$F(t,T) = \sum_{i=1}^N \frac{\alpha_i}{\lambda_i} e^{-\lambda_i t} (1 - e^{-\lambda_i T}) \quad (\text{MeV/fiss}) \quad . \quad (D7)$$

Alternately, we can fit Eq. (D7) to the result of, for example, an experiment following a finite fission time to generate the parameters α_i , λ_i for an equivalent pulse function. This is useful, for example, when it is necessary to combine the results of several experiments, all having different fission intervals.

In the ANS 5.1 decay-heat standard, the concept of heating (or energy release rate) function following an infinite, constant fission rate ($T \rightarrow \infty$) is used and is derived from the pulse function. That is,

$$F(t, \infty) = \int_0^{\infty} f(t') dt' \quad . \quad (D8)$$

This is only possible in the absence of neutron absorption. Otherwise the magnitude of $F(t, T)$ would increase continuously with increases in T . However, the concept is useful in that the $F(t, \infty)$ function could, like the pulse function, be used to generate the finite irradiation values. Thus,

$$\begin{aligned} F(t, T) &= \int_t^{t+T} f(t') dt' = \int_t^{\infty} f(t') dt' - \int_{t+T}^{\infty} f(t') dt' \\ &= F(t, \infty) - F(t+T, \infty) \quad (\text{MeV/fiss}) \quad . \end{aligned} \quad (D9)$$

The pulse function $f(t)$ and the infinite irradiation function $F(t, \infty)$ therefore contain equivalent information. In this report, we have concentrated on generating the pulse function because users will likely find it easier to apply to a variable fission history (although either function can be used). It should be noted the the α_i , λ_i parameters apply for either function, provided that the fit extends over a sufficiently long cooling time. Thus,

$$F(t, \infty) = \sum_{i=1}^N \frac{\alpha_i}{\lambda_i} e^{-\lambda_i t} \quad (\text{MeV/fiss}) \quad . \quad (D10)$$

However, for practical reasons, the ANS 5.1 decay-heat standard defines 10^{13} s as infinity so that the factor $(1 - e^{-\lambda_i T})$ with $T = 10^{13}$ s multiplies the terms in this expression; that is, Eq. (D7) is used for $F(t, \infty)$ in the standard where $T = 10^{13}$ s.

In the case of a variable fission rate $S(t)$, it is necessary to use MeV/s rather than MeV/fiss [i.e., $H(t, T)$ rather than $F(t, T)$].

$$H(t, T) = \int_0^T S(t') f(t+T-t') dt' \quad (\text{MeV/s}) \quad . \quad (D11)$$

Alternatively, one can use the power level

$$H(t,T) = \int_0^T \frac{P(t')}{K} f(t+T-t') dt' \quad (\text{MeV/s}) \quad , \quad (\text{D12})$$

where

$P(t)$ = power in watts at time t ,

and

K = watt-s/fiss (for 200 MeV/fiss, $K = 0.32042 \times 10^{-10}$) .

II. APPLICATION OF THE FUNCTIONAL FITS

The Variable $f(t)$ is only a symbolic representation of pulse library data -- of the summation code output. Most of the expressions in this appendix and in the main text are useful only when the pulse values are approximated by a simple functional form such as Eq. (D4). With Eq. (D4), the user can readily construct expressions to be used in practice. For example, if $P(t)$ can be described by J histograms of constant power P_j over time intervals T_j , then

$$H(t,T) = \sum_{j=1}^J \frac{P_j}{K} \sum_{k=1}^N \frac{\alpha_k}{\lambda_k} \left[e^{-\lambda_k(T+t-T_j)} - e^{-\lambda_k(T+t-T_{j-1})} \right] \quad (\text{MeV/s}) \quad , \quad (\text{D13})$$

where $T_0 = 0$.

If the power is constant over the entire period, then this reverts back to Eq. (D7) multiplied by P/K .

The reader is reminded that there is a set of coefficients (α_i, λ_i) for each energy group and for each fissioning nuclide. Thus, the expression [Eq. (D13)] should, strictly, have a group subscript. In addition, if there is more than one fissioning nuclide, the P_j/K should be replaced by the fission rate for each nuclide $S_{j\ell}$ and summed over ℓ . In general, for each group g , Eq. (D13) becomes

$$H_g(t,T) = \sum_{j=1}^J \sum_{\ell=1}^L S_{j\ell} \sum_{k=1}^N \left[\frac{\alpha_{k\ell g}}{\lambda_{k\ell g}} e^{-\lambda_{k\ell g}(T+t-T_j)} - e^{-\lambda_{k\ell g}(T+t-T_{j-1})} \right] \quad (\text{D14})$$

III. ABSORPTION EFFECTS

Absorption couples mass chains and changes the fission-product distribution. The effect is dependent on the type of reactor (neutron spectrum) and the power history (magnitude of the neutron flux). Therefore, precise calculations of $F(t,T)$ or $H(t,T)$ must resort to summation calculations; there is no single tabulation of $F(t,T)$ appropriate to all reactors and, of course, the pulse function does not incorporate the absorption effects.

Most of the absorption effect occurs in those nuclides near the line of nuclide stability where half-lives are long and where most of the radioactive nuclides that are shielded from precursor decay by stable nuclides are located. Because these nuclides are not only generally long lived but also have relatively small decay energies, their effect is primarily evident following a long fission interval and long cooling times.

On a nuclide-by-nuclide basis, the neutron absorption can increase or decrease nuclide concentrations, hence decay energy. Except for a few nuclides, the net effect is small and positive. At some cooling times there is a very large effect that can be identified as due to only a few specific nuclides. Because these are few in number and do not require explicit calculation of their short-lived precursors, it is possible and practical to supplement the $F(t,T)$ and $H(t,T)$ values with values from correction equations that account for the modified spectra at long cooling times for any power history. This has been done in the main text, and parameters appropriate to light water reactors are included there. The equations apply to any type of reactor with appropriate cross sections. For completeness, this appendix summarizes the basis of the corrections.

The most significant absorption effects do not require explicit calculations for short-lived precursors nor do the significant corrections require computation of multiple captures in fission products. However, the corrections are dependent on fluence, flux level, and neutron spectrum. While the net correction could be approximated with an empirical expression at short cooling times, the long cooling times, where corrections are particularly important, require accurate knowledge of the behavior of specific nuclides. For this we have found that two nuclides per chain for those few nuclides presented in the main text are sufficient. In addition, a general solution of the differential equations for two coupled nuclides can be programmed and used for all nuclide pairs.

Let N_1, N_2 = the density of the first and second nuclide, where 1 and 2 denote parameters of the respective nuclides (N is normally given in units of 1/b-cm).

$A = \int_0^\infty \sigma \phi dE$ = absorption rate per unit density. If ϕ is given on a group basis (two groups are adequate for thermal reactors), the value of A is $\sum_g \sigma_g \phi_g$ (s^{-1}).

λ = decay constant (s^{-1}).

S_i = fission rate from fuel i (fiss/s-b-cm).

y_i = nuclide yield per fission from fuel i .

E_j = energy per decay, where j denotes the β or γ decay group (MeV).

α = branching fraction for the type of coupling between nuclide 1 and 2.

[The nuclide subscript (1,2) has been omitted for simplicity of expression from λ , y_i , E_j and α .]

For simplicity in writing the general solution, let

$$\beta \equiv A + \lambda \quad . \quad (D15)$$

$$Y \equiv \sum_j y_j S_j \quad (j \text{ denotes fissionable nuclide}) \quad . \quad (D16)$$

$$\gamma \equiv \alpha A \text{ or } \alpha \lambda \quad \text{depending on the coupling, where the yields } y_j \text{ will be cumulative, direct, or zero, depending on } j \text{ the nuclide.} \quad (D17)$$

With or without neutron absorption (i.e., $\beta \equiv \lambda$ in absence of absorption), the general solution for N_1 and N_2 during a constant fission rate for a time interval t are

$$N_1(t) = Y_1 \frac{(1 - e^{-\beta_1 t})}{\beta_1} + N_1(0) e^{-\beta_1 t} \quad , \quad (D18)$$

$$\begin{aligned}
N_2(t) = & \gamma_1 Y_1 \left[\frac{1}{\beta_1 \beta_2} - \frac{e^{-\beta_1 t}}{\beta_1 (\beta_2 - \beta_1)} + \frac{e^{-\beta_2 t}}{\beta_2 (\beta_2 - \beta_1)} \right] \\
& + \gamma_1 N_1(0) \left[\frac{e^{-\beta_1 t} - e^{-\beta_2 t}}{\beta_2 - \beta_1} \right] + Y_2 \left[\frac{1 - e^{-\beta_2 t}}{\beta_2} \right] + N_2(0) e^{-\beta_2 t} \quad (D19)
\end{aligned}$$

For a constant fission rate over the entire fission interval, $N_1(0) = N_2(0) = 0$ for fission products. If the power or fission history is variable, as would be the flux and $\beta_{1,2}$ values, these equations can still be applied by using Δt_j in place of t for each histogram interval j and using $N_1(\Delta t_{j-1})$ and $N_2(\Delta t_{j-1})$ in place of $N_1(0)$ and $N_2(0)$. In this case, $N_{1,2}(t)$ is the density at $t_j = \Delta t_1 + \Delta t_2 + \dots + \Delta t_j$. The associated group decay energies are thus $\lambda_{NE_{\gamma,\beta}}$.

It is necessary to evaluate these equations during and following the fission interval. In addition, it is necessary to subtract the densities or energy emission rates that occur in the absence of neutron absorption because this energy is included in the $F(t,T)$ and $H(t,T)$ functions. From a computer code viewpoint, this is easiest to do by coding the general equations and computing the results with and without a neutron flux -- or, rather, a flux too small to result in any significant absorption effects.

We assume that the fission history can be described by histogram intervals during which Y and A are constant. In this case, $N(0) = 0$ for the first interval and Eqs. (D18) and (D19) provide the basis for recursion equations for subsequent intervals j of duration Δt_j . For example, Eq. (D18) becomes

$$N_1(t_j) = N_{1j} = Y_{1j} \frac{(1 - e^{-\beta_{1j} \Delta t_j})}{\beta_{1j}} + N_{1j-1} e^{-\beta_j \Delta t_j} \quad , \quad (D20)$$

$$j = 1, 2, 3, \dots, J,$$

and similarly for $N_2(t_j)$.

If J = the final fission interval, then at any shutdown time t

$$N_1(t) = N_{1J} e^{-\lambda_1 t} \quad , \quad (D21)$$

$$N_2(t) = \alpha_1 \lambda_1 N_{1J} \left(\frac{e^{-\lambda_1 t} - e^{-\lambda_2 t}}{\lambda_2 - \lambda_1} \right) + N_{2J} e^{-\lambda_2 t} \quad . \quad (D22)$$

Note that if the coupling is by (n, γ) , then the first term for $N_2(t)$ in Eq. (D22) is zero, that is,

$$N_2(t) = N_{2J} e^{-\lambda_2 t} \quad . \quad (D23)$$

(In programming these equations, any potential problem with roundoff can be avoided by replacing each beta or lambda with, for example, $\beta(1-10^{-9}/t)$, where t is the shutdown time or Δt_j appearing in the exponentials. This permits Eqs. (D20)-(D23) to be evaluated without resorting to a special set of equations, yet the effects of the change in beta are too small to alter calculated densities.)

The energies are given by

$$\text{MeV/s} = ([N(t) - N(t)'] \lambda E) \quad , \quad (D24)$$

where $N(t)'$ is the density without neutron absorption.

If the fission rate S is constant and applies to a single fissioning nuclide, the MeV/fiss from any nuclide is

$$\text{MeV/fiss} = \frac{\text{MeV/s}}{\text{fiss/s}} = \frac{[N(t) - N(t)'] \lambda E}{S} \quad . \quad (D25)$$