

**PACKAGE ID** - 000268ALLFX00 SPECFUN2.5

**KWIC TITLE** - Portable Special Function Routines

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**LIMITATION CODE** -UNL                   **AUDIENCE CODE** - UNL

**COMPLETION DATE** - 03/01/1991   **PUBLICATION DATE** - 03/01/1991

**DESCRIPTION** - SPECFUN is a collection of transportable FORTRAN subroutines and accompanying test drivers to evaluate certain special functions.

**PACKAGE CONTENTS** - NESC Note; Software Abstract; PREPRINT MCS-P13-0988; The Use of Taylor Series to Test Accuracy of Function Programs; Performance Evaluation of Programs for Certain Bessel Functions; SPECFUN-A Portable Special Function Package;

**SOURCE CODE INCLUDED?** - Yes

**MEDIA QUANTITY** - 1 CD Rom

**METHOD OF SOLUTION** - SPECFUN generally uses rational minimax approximations for functions of one variable and recurrence relations for functions of two or more variables.

**COMPUTER** - ALLIANT FX

**OPERATING SYSTEMS** - Designed to be operating system independent

**PROGRAMMING LANGUAGES** - FORTRAN 77

**SOFTWARE LIMITATIONS** - Accuracy is targeted at between 18 and 20 significant decimal digits.

**SOURCE CODE AVAILABLE (Y/N)** - Y

**UNIQUE FEATURES** - Predetermined parameters for a selection of popular machines are included in COMMENTS at the top of SPECFUN routines. Conversion of a routine for a particular machine is then a simple matter of determining the proper parameter values, either from the given values or through computations based upon the definitions supplied and inserting them in DATA statements in the routine. The MACHAR program computes machine parameters from a built-in model of the arithmetic system.

**RELATED SOFTWARE** - Largely replaces FUNPACK2.

**OTHER PROG/OPER SYS INFO** - All precision-dependent source statements are duplicated. Statements peculiar to single-precision contain 'CS' in the first two columns, while their immediately following

**PACKAGE ID** - 000268ALLFX00 SPECFUN2.5

**OTHER PROG/OPER SYS INFO - (CONT)** double-precision counterparts contain 'CD'. A precision-specific source is produced by global editing changes of the characters CS or CD to blanks in the first two characters of the appropriate source statements.

**REFERENCES** - W.J. Cody, SPECFUN, A Portable Special Function Package, ANL-MCSD memorandum, received May 1986; SPECFUN2.5, NESC No. 9641, SPECFUN2.5 Tape Description and Implementation Note, National Energy Software Center Note 86-90, August 18, 1986\ W.J. Cody, FUNPACK, A Package of Special Function Routines, W.R. Cowell, Ed., Sources and Development of Mathematical Software, Prentice-Hall, Englewood Cliffs, New Jersey, pp. 49-67, 1984; W.J. Cody, Implementation and Testing of Function Software, P.C. Messina and A. Murli, Ed., Problems and Methodologies in Mathematical Software Production, Springer-Verlag, New York, pp. 24-47, 1982.

**ABSTRACT STATUS** - Abstract first distributed August 1986. SPECFUN1 submitted May 1986, replaced March 1991 by SPECFUN2.5.

**SUBJECT CLASS CODE** - P

**KEYWORDS** -

COMPUTER PROGRAM DOCUMENTATION  
S CODES  
FUNCTIONS  
INTEGRALS  
BESSEL FUNCTIONS  
GAMMA FUNCTION

**EDB SUBJECT CATEGORIES** -  
990200

**SPONSOR** - DOE/ER

**PACKAGE TYPE** - SCREENED