

PACKAGE ID - 000330IBMPC00 DORIAN

KWIC TITLE - Bayes Method Plant Aging Risk Analysis

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

COMPLETION DATE - 04/01/1991 **PUBLICATION DATE** - 04/01/1990

DESCRIPTION - DORIAN is an integrated package for performing Bayesian aging analysis of reliability data; e.g. for identifying trends in component failure rates and/or outage durations as a function of time. The user must specify several alternatives hypothesized aging models (i.e. possible trends) along with prior probabilities indicating the subjective probability that each trend is actually the correct one. DORIAN then uses component failure and/or repair data over time to update these prior probabilities and develop a posterior probability for each aging model, representing the probability that each model is the correct one in light of the observed data rather than a priori. Mean, median, and 5th and 95th percentile trends are also compiled from the posterior probabilities.

PACKAGE CONTENTS - NESC Note 92-07; Software Abstract; EGG-SSRE-8991;
Media Includes Executable, Sample Problem, Control Information;

SOURCE CODE INCLUDED? - No

MEDIA QUANTITY - 1 3.5 Diskette

METHOD OF SOLUTION - DORIAN carries out a Bayesian analysis of failure data and a prior distribution on a time-dependent failure rate to obtain a posterior distribution on the failure rate. The form of the time-dependent failure rate is arbitrary, because DORIAN approximates the form by a step function, constant within specified time intervals. Similarly, the parameters may have any prior distribution, because DORIAN uses a discrete distribution to approximate this. Likewise, the database file produced by DORIAN approximates the entire range of possible failure rates or outage durations developed by means of a discrete probability distribution containing no more than 20 distinct values with their probabilities.

COMPUTER - IBM PC

OPERATING SYSTEMS - MS-DOS 3.3 or later

PROGRAMMING LANGUAGES - FORTRAN 77 and C

SOFTWARE LIMITATIONS - Prior distribution is discrete with up to 25 values. Up to 60 times are accommodated in the discrete time

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SOFTWARE LIMITATIONS - (CONT) history.

SOURCE CODE AVAILABLE (Y/N) - N

RELATED SOFTWARE - DORIAN is compatible with the RISKMAN system for risk analysis, Pickard, Lowe, and Garrick, Inc. proprietary workstation software. The MicroEMACS 3.8 editor is provided as part of the DORIAN software package.

OTHER PROG/OPER SYS INFO - The source is not supplied as part of this package.

HARDWARE REQS - DORIAN requires an IBM PC or compatible computer with 640 Kbytes of memory, a fixed disk, one 3.5-inch, 720 Kbyte flexible disk drive, a color monitor (CGA, EGA, or VGA), and a math coprocessor.

REFERENCES - Vicki M. Bier, Dennis C. Bley, David H. Johnson, Stan Kaplan, and Janet E. Williamson, Development and Demonstration of Methods for Nuclear Power Plant Aging Risk Analysis: Dorian Users Manual, EGG-SSRE-8991, April 1990; DORIAN, NESC No. 1146; DORIAN Flexible Disk Cartridge Description, National Energy Software Center Note 92-07, October 8, 1991.

ABSTRACT STATUS - Abstract first distributed October 1991. IBM PC version submitted April 1991.

SUBJECT CLASS CODE - G

KEYWORDS -

COMPUTER PROGRAM DOCUMENTATION
D CODES
FAILURE MODE ANALYSIS
REACTOR COMPONENTS
RISK ASSESSMENT
AGING
NUCLEAR POWER PLANTS
PROBABILISTIC ESTIMATION

EDB SUBJECT CATEGORIES -

990200 220900 220200

SPONSOR - DOE/IO;NRC/RES

PACKAGE TYPE - SCREENED