PACKAGE ID - 000247IPCAT00 ORMONTE

KWIC TITLE - Monte Carlo Sensitivity Analysis Code

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

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DESCRIPTION - ORMONTE is a Monte Carlo-based sensitivity analysis code which operates on a FORTRAN model supplied by the user for a particular application. Users identify the uncertain variables associated with their model and select their probability distributions or ranges. ORMONTE samples these distributions and repeatedly submits sample vectors to the user's model (which is made a SUBROUTINE callable by ORMONTE) to obtain output vectors consisting of uncertain figures-of-merit from the user's model. ORMONTE produces a probability histogram for each output variable of interest so that the risk associated with the attainment of a given deterministic value can be assessed. ORMONTE essentially performs what are often called multivariable sensitivity studies (MVSS). It can also be used to perform sequential single value sensitivity studies and elasticity analysis. The latter application allows calculation of the coefficient of sensitivity for a figure-of-merit around a given deterministic or base-case input value. ORMONTE has been applied mainly to drive performance and economic models for energy-related systems or processes. The code is sufficiently general that it can be linked with any type of FORTRAN model where uncertainties exist in the input. A Probability Data Analysis (PDA) package is included for acquisition and characterization of raw probabilistic input data.

PACKAGE CONTENTS - NESC Note; Software Abstract; ORMONTE: A PC Code for Cost/Risk Analysis; ORNL/TM-10714; K/OA-5684;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 5.25 Diskette

METHOD OF SOLUTION - The Monte Carlo method is used to produce the hundreds of input value sets submitted to the user's model. After all iterations are completed, ORMONTE sorts the input and output variable values and produces probability histograms. It also performs a statistical analysis for each uncertain input and output variable, calculating the standard deviation, median, mean, and selected percentile probability ranges. Each run consists of a minimum of a few hundred iterations.

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COMPUTER - IBM PC/AT

OPERATING SYSTEMS - MS-DOS 2.1 or later

PROGRAMMING LANGUAGES - Ryan McFarland FORTRAN 2.0 (96%) and Assembler (4%)

SOFTWARE LIMITATIONS - The user may choose any of eleven different input probability distributions for describing input data uncertainty. ORMONTE can handle up to 150 uncertain variables (the sum of input and output variables).

SOURCE CODE AVAILABLE (Y/N) - Y

OTHER PROG/OPER SYS INFO - The Lotus Development Corporation's proprietary Lotus 1-2-3 version 2.01 or later is required to exercise the probability data analysis (PDA) option; this software is not included. TCTRAN.ASM, a random number generator for the Intel 8088 family of computers, is written in Assembler language.

HARDWARE REQS - ORMONTE requires an IBM PC/AT or compatible computer with an 80287 math coprocessor, hard disk, flexible disk cartridge drive, video display terminal, and a laser-jet or dot-matrix printer.

TIME REQUIREMENTS - The running time for ORMONTE depends on the machine used, the complexity of the user's model being driven by ORMONTE, and the desired accuracy for the uncertain output variables. At a minimum, the time is several seconds per run. Some applications using very complex models could require a run of several hours.

REFERENCES - K. A. Williams and C. R. Hudson II, ORMONTE: An Uncertainty Analysis Code for Use with User-Developed Systems Models on Mainframe or Personal Computers - A User's Guide, ORNL/TM-10714, May 1989; K. A. Williams, A Methodology for Economic Evaluation of Process Technologies in the Early Research and Development Stages, K/OA-5684, August 1, 1984; K. A. Williams, ORMONTE: A PC Code for Cost/Risk Analysis, Transactions of the 33rd Annual Meeting of the American Association of Cost Engineers, San Diego, CA, pp. b2.1-b2.9, 1989; ORMONTE, NESC No. 9471, ORMONTE Flexible Disk Cartridge Description, National Energy Software Center Note 91-10, October 31, 1990.

ABSTRACT STATUS - Abstract first distributed October 1990. IBM PC/AT version submitted June 1989.

SUBJECT CLASS CODE - P

KEYWORDS -
COMPUTER PROGRAM DOCUMENTATION
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SENSITIVITY ANALYSIS
MONTE CARLO METHOD
STATISTICS
COST
FORECASTING
ECONOMIC ANALYSIS
PROBABILISTIC ESTIMATION
RISK ASSESSMENT
SYSTEMS ANALYSIS
PERSONAL COMPUTERS
COMPUTERIZED SIMULATION

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/DP

PACKAGE TYPE - SCREENED