

PACKAGE ID - 000179I309000 EISPACK3

KWIC TITLE - Matrix Eigenvalue/Vector Package

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

COMPLETION DATE - 02/01/1989 **PUBLICATION DATE** - 04/01/1984

DESCRIPTION - EISPACK3 is a collection of 75 FORTRAN subroutines, both single and double-precision, that compute the eigenvalues and eigenvectors of nine classes of matrices. The package can determine the eigensystem of complex general, complex Hermitian, real general, real symmetric, real symmetric band, real symmetric tridiagonal, special real tridiagonal, generalized real, and generalized real symmetric matrices. In addition, there are two routines which use the singular value decomposition to solve certain least squares problems.

PACKAGE CONTENTS - NESC Note; Software Abstract; ANL/MCS-TM-12; Media Includes Source Code, Sample Problems, Auxiliary Routines, Machine-Readable Documentation;

SOURCE CODE INCLUDED? - Yes

MEDIA QUANTITY - 1 CD Rom

METHOD OF SOLUTION - Almost all the algorithms are based on similarity transformations. QR, LR, QL, rational QR, bisection, QZ, and inverse iteration methods are used.

COMPUTER - IBM3090

OPERATING SYSTEMS - Machine dependent

PROGRAMMING LANGUAGES - ANSI 1966 FORTRAN, FORTRAN77

SOURCE CODE AVAILABLE (Y/N) - Y

UNIQUE FEATURES - The IBM3090VF version uses vector registers and cache.

RELATED SOFTWARE - The subroutines are based on the ALGOL procedures in Volume II of the Springer-Verlag Handbook for Automatic Computation series and the QZ algorithm of Moler and Stewart in volume 10 of the SIAM Journal of Numerical Analysis.

HARDWARE REQS - Vary according to usage.

TIME REQUIREMENTS - On the IBM3033 NESC executed each of the sample cases in from 2 to 10 CPU seconds.

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TIME REQUIREMENTS - (CONT)

REFERENCES - J.J. Dongarra and C.B. Moler, EISPACK - A Package for Solving Matrix Eigenvalue Problems, ANL Mathematics and Computer Science Division Technical Memorandum 12, revised April 1984; EISPACK3, NESC No. 534.3090, EISPACK3 IBM3090VF Version Tape Description, National Energy Software Center Note 90-32, December 19, 1989\ B.T. Smith, J.M. Boyle, J.J. Dongarra, B.S. Garbow, Y. Ikebe, V.C. Klema, and C.B. Moler, Matrix Eigensystem Routines-EISPACK Guide, Lecture Notes in Computer Science, Volume 6 2nd Edition, G. Goos and J. Hartmanis, Springer-Verlag, New York, Heidelberg, Berlin, 1976; B.S. Garbow, J.M. Boyle, J.J. Dongarra, and C.B. Moler, Matrix Eigensystem Routines-EISPACK Guide Extension, Lecture Notes in Computer Science, Volume 51, G. Goos and J. Hartmanis, Springer-Verlag, New York, Heidelberg, Berlin, 1977.

ABSTRACT STATUS - Abstract first distributed October 1972. IBM3090VF version of EISPACK3 submitted February 1989, sample problems executed by NESC June 1989 on an IBM3090.

SUBJECT CLASS CODE - P

KEYWORDS -

E CODES
MATRICES
EIGENVALUES
EIGENVECTORS
ITERATIVE METHODS
MATHEMATICS
FUNCTIONS
COMPUTER PROGRAM DOCUMENTATION

EDB SUBJECT CATEGORIES -
990200

SPONSOR - DOE/ER

PACKAGE TYPE - TESTED