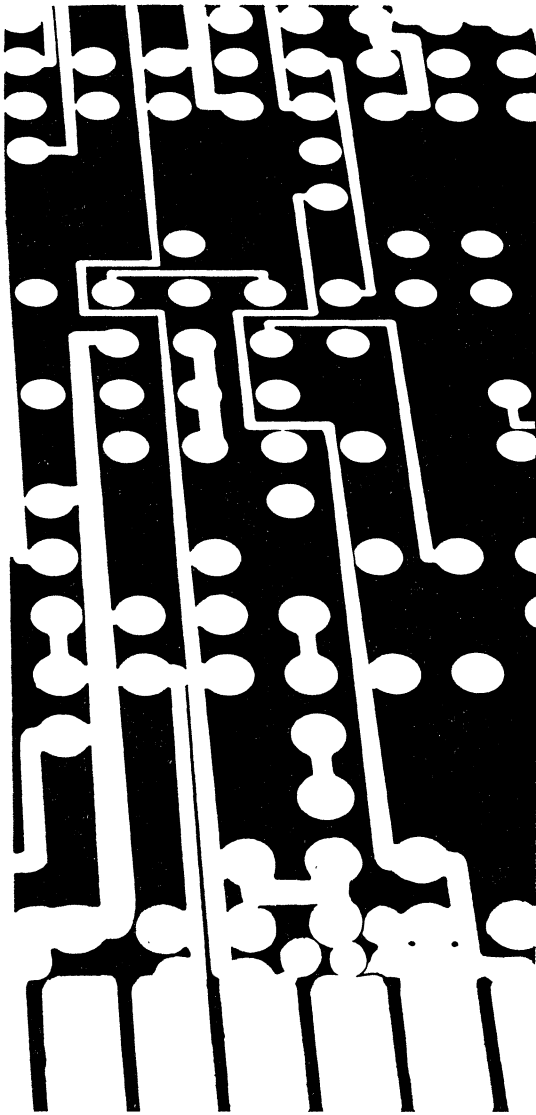


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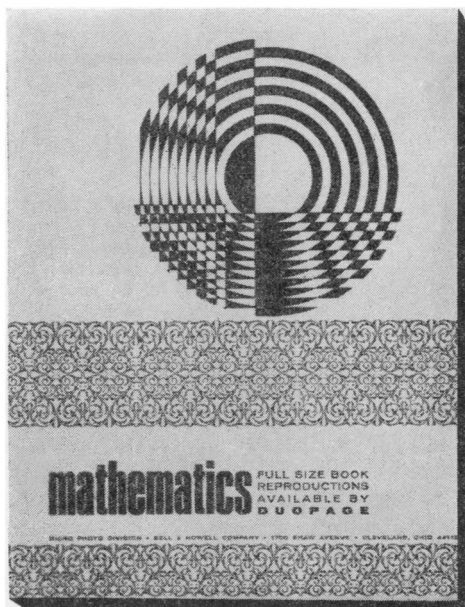
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The editorial committee would welcome readers' comments about this microfiche feature. Please send comments to Professor Eugene Isaacson, MATHEMATICS OF COMPUTATION, Courant Institute of Mathematical Sciences, New York University, 251 Mercer Street, New York, New York 10012.

Mathematics of Computation

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**THE CALCULATION OF THE EIGENVECTORS OF A
GENERAL COMPLEX MATRIX BY INVERSE ITERATION**

J. M. Varah

See article in this issue for explanation of symbols in table.

```

PROCEDURE HESSEVECTORS(N,A,RTR,RTI,U)
  VALUE N INTEGER N
  ARRAY A,RTR,RTI,U

```

```

BEGIN

```

```

COMMENT THIS PROCEDURE FINDS THE N COLUMN EIGENVECTORS OF THE N*N REAL
UPPER HESSEBERG MATRIX A, GIVEN THE EIGENVALUES STORED IN
(RTR(K)+RTI(K)*I) WITH COMPLEX CONJUGATE PAIRS CONSECUTIVE. THE
EIGENVECTORS ARE STORED BY COLUMNS IN U. IF THE K-TH EIGENVALUE IS
COMPLEX, COLUMN K IS THE REAL PART AND COLUMN K+1 THE IMAGINARY
PART OF THE EIGENVECTOR CORRESPONDING TO EIGENVALUE K.

```

```

FOR BEST RESULTS, A SHOULD BE SCALED SO ITS MAXIMUM ELEMENT IS
CLOSE TO 1 AND BALANCED BY DIAGONAL SIMILARITY TRANSFORMATIONS SO
ITS I-TH ROW AND COLUMN SUMS ARE ABOUT EQUAL, FOR I=1,...,N.

```

```

WE ASSUME THE FOLLOWING MACHINE DEPENDENT CONSTANTS ARE AVAILABLE
MACHEPS = SINGLE PRECISION FLOATING-POINT ROUND-OFF LEVEL - THAT IS,

```

```

  THE SMALLEST POSITIVE MACHINE NUMBER ETA SUCH THAT
  1 + ETA > 1

```

```

MACHNEGL = SMALLEST NORMALIZED POSITIVE NUMBER REPRESENTABLE
ON THE MACHINE

```

```

COMMENT FIRST DECLARE OTHER PROCEDURES

```

```

REAL PROCEDURE MAX(A,B)
  VALUE A,B
  REAL A,B
  MAX:=IF A>B THEN A ELSE B

```

```

REAL PROCEDURE MIN(A,B)
  VALUE A,B
  REAL A,B
  MIN:=IF A<B THEN A ELSE B

```

```

REAL PROCEDURE ABS(C(A,B))
  VALUE A,B
  REAL A,B
  COMMENT GIVES MODULUS OF COMPLEX NUMBER A+BI

```

```

BEGIN

```

```

  A:=ABS(A) B:=ABS(B)
  ABS:=IF A<B THEN B*SQRT(1+(A/B)^2)
  ELSE A*SQRT(1+(B/A)^2)

```

```

END ABS

```

```

REAL PROCEDURE INNERPRODUCT(I,M,N,A,B,C)
  VALUE M,N,C
  INTEGER I,M,N REAL A,B,C

```

```

BEGIN COMMENT BODY OF PROCEDURE SHOULD BE REPLACED BY
DOUBLE PRECISION MACHINE CODES

```

```

FOR I=M STEP 1 UNTIL N DO C:=C+A*B
INNERPRODUCT:=C

```

```

END INNERPRODUCT

```

```

PROCEDURE NORMREAL(N,V,VNORM)

```

```

  VALUE N
  INTEGER N ARRAY V REAL VNORM

```

```

BEGIN COMMENT THIS PROCEDURE NORMALIZES THE REAL VECTOR V OF DIMENSION

```