20. COMPUTER PROGRAMS

In this section we give a typical computer program which implements one of the algorithms of Section 17 with the help of the discretization procedure stated in Section 18. The program is written in FORTRAN 77. We also show how this program can be modified to cover other cases.

We begin by documenting the program.

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PROGRAM ITEIG

* PURPOSE *
COMPUTATION OF ITERATES FOR APPROXIMATING A SIMPLE EIGENVALUE AND A
CORRESPONDING EIGENVECTOR OF AN INTEGRAL OPERATOR BY THE
RAYLEIGH-SCHRÖDINGER SCHEME USING THE FREDHOLM METHOD(2)

* REFERENCES *
ALGORITHM 17.8 AND TABLE 19.1 ALONG WITH THE DISCRETIZATION PROCEDURE OF
SECTION 18 IN THE MONOGRAPH ENTITLED SPECTRAL PERTURBATION AND
APPROXIMATION WITH NUMERICAL EXPERIMENTS BY B.V. LIMAYE.  THE PROGRAM
WAS WRITTEN BY R.P. KULKARNI AND B.V. LIMAYE.

* PARAMETERS *
L          - THE DESIRED NUMBER OF ITERATIONS
M          - THE ORDER OF THE MATRIX TM WHICH DISCRETIZES AN INTEGRAL
             OPERATOR T
N          - THE ORDER OF THE MATRIX A
N1         - THE SERIAL NUMBER OF THE SELECTED EIGENVALUE OF A

* MAJOR DATA STRUCTURES *
TM         - M BY M MATRIX WHICH DISCRETIZES THE INTEGRAL OPERATOR T
A          - N BY N REAL SYMMETRIC MATRIX FOR WHICH WE INITIALLY SOLVE
             AN EIGENVALUE PROBLEM
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