NASA TECH BRIEF

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Subroutines for Evaluating Single and Multiple Integrals Using Modified Romberg Method

The problem:

To evaluate both single and multiple integrals.

The solution:

ROMBD and ROMBS, double and single precision computer subroutines, respectively, for numerical quadrature using a modified Romberg precedure with a variable step size. The package also contains subroutines RMB1, RMB2, and RMB3 evaluating multiple integrals.

How it's done:

The routines represent a "state of the art" in their field. They have been thoroughly tested and found to be equal to or better than comparable routines. The programs have been compared to SQUANK (Lyness, J.: Notes on the Adaptive Simpson Quadrature Routine. ACM Journal, Volume 16. July 1969) and found to be more reliable and capable of solving a larger class of problems.

Although RMBD and RMBS are designed to serve as a library "standard" for solving most of the problems of the form $I = \int_a^b f(x)dx$, it must be recognized that with singularities and certain discontinuities in f(x), Gaussian quadrature or other methods may be more appropriate.

Subroutine RMB1 with successive calls to RMB2 and a final call to RMB3 comprise the single precision package for multiple integration. ROMBS is used as the basic integration technique.

Notes:

1. This program is written in FORTRAN V for use on the UNIVAC-1108 computer. The routines are easily convertible to FORTRAN IV.
2. Requests for further information may be directed to:

   COSMIC
   Barrow Hall
   University of Georgia
   Athens, Georgia 30601
   Reference: B71-10138

Patent status:

No patent action is contemplated by NASA.

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