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IDENTIFICATION

RUNGE-KUTTA AND PRINT, MU RKP1
704 FORTRAN II Program
G. A. Westlund - October 20, 1959
Midwestern Universities Research Association, Madison, Wisconsin

PURPOSE

To solve a set of M simultaneous, first order, ordinary differential equations by the Gill method, and print the results at specified intervals.

METHOD

The integration is performed by the MURKY5 Floating Point Runge-Kutta subroutine (see MURA-504).

USAGE

RKP1 is available on the FORTRAN II system tape at this installation. It is called by means of the following statement in a main program:

```
CALL RKP1 (Y, M, YMAX, NE, NPZ, NP, H, F, S).
```

M is the number of equations to be solved. NE is the number of integration steps, of size H each, to be performed. Y is an array of dependent variables to be solved. YMAX is an array of maximum permissible absolute values of the Y's. F is an array of the derivatives of the Y's. S is a block used by MURKY5 for temporary storage. The dimensions of Y, YMAX, F, and S must be at least M, M, M, and 5M respectively.

The current values of the Y's are printed after the NPZth integration step, and after every NPth step thereafter.

Control is returned to the main program after NE integration steps.

AUXILIARY REQUIREMENT

The user must provide an auxiliary subroutine to compute the derivatives of the Y's and store them in the F array. This subroutine must be named WRKY5, and the arguments must refer to the Y and F arrays:

```
SUBROUTINE WRKY5 (Y, F)
```

MURKY5 enters WRKY5 four times during each integration step to obtain new values of the F's.

PROGRAMMED STOPS

If, after any integration step, the absolute value of a Y should equal or exceed the value of the corresponding YMAX, the Y's followed by the corresponding YMAX's will be printed, and the program will stop.