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Submitter : **Submitted:** 15.01.1988
Language : Fortran **Revised:** 15.03.1993

Integration by Simpson's Rule

Function subprograms `SIMPS` and `DSIMPS` use Simpson's rule to compute an approximate value of the integral

$$I = \int_A^B f(x)dx.$$

On CDC or Cray computers, the double-precision version `DSIMPS` is not available.

Structure:

`FUNCTION` subprograms
User Entry Names: `SIMPS`, `DSIMPS`
Files Referenced: `Unit 6`
External References: `MTLMTR` (N002), `ABEND` (Z035)

Usage:

In any arithmetic expression,

`SIMPS(F,A,B,N)` or `DSIMPS(F,A,B,N)`

has the approximate value of the integral I, where `SIMPS` is of type `REAL` and `DSIMPS` is of type `DOUBLE PRECISION`, and `F`, `A`, `B` have the same type as the function name. `N` is of type `INTEGER`.

`F` One-dimensional array with dimension `(0:d)`, where $\mathtt{d} \geq \mathtt{N}$, containing the value of $f(x)$ at $\mathtt{N}+1$ equally-spaced points x_i, $(i = 0, 1, \ldots, \mathtt{N})$, with $x_0 = \mathtt{A}$ and $x_\mathtt{N} = \mathtt{B}$.

`A,B` End-points of integration interval.

`N` As defined above. `N` must be positive and even.

Error handling:

Error `D101.1`: $\mathtt{N} \leq 0$ or `N` odd. The function value is set equal to zero, and a message is written on `Unit 6`, unless subroutine `MTLSET` (N002) has been called.

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