1 SUMMARY

This routine produces numerical estimates of the rounding errors generated in floating point arithmetic on the computer in use.


2 HOW TO USE THE PACKAGE

2.1 The argument list and calling sequence

*The single precision version*

CALL ZE01A(A, B, C, D)

*The double precision version*

CALL ZE01AD(A, B, C, D)

There are no input arguments. On return, \(A\) is set to the maximum modulus of the relative rounding error found in 100 additions (without cancellation) and 100 multiplications, followed in each case by subtractions or divisions.

\(B\) is set to the mean modulus of the errors.

\(C\) is set to the mean signed relative rounding errors for the additions, and \(D\) to that for multiplications.

3 METHOD

A set of 100 pairs of positive numbers (P, Q) is generated, chosen to be not exactly representable either on a decimal computer or on one working to the base 2, 4, 8, 16 etc. The sum and product (S and T) of each pair is calculated and stored: Q is subtracted from S-P and the result divided by S, to give the relative error on addition/subtraction; Q is subtracted from T/P, and the result divided by Q, to give the relative error on multiplication/division.