1 SUMMARY

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

ATTRIBUTES — **Version:** 1.0.0. **Types:** `ZE01A, ZE01AD` **Original date:** June 1966. **Origin:** A.R. Curtis, Harwell.

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.