

Exercises on Numerical Programming

Extended Precision

Find an implementation of an extended-precision data type for real numbers using two double-precision numbers. The idea here is that each extended-precision number has a high (most significant) and low (least significant) part:

high part (real*8)	low part (real*8)
--------------------	-------------------

This is of course not quite the same as quadruple precision, even though it takes the same storage. It does help, however, to perform an operation such as $10^{20} + 10^{-20}$ without loss of precision.

Task: program the addition and multiplication operations for such a kind of extended-precision number. The output of each operation should be normalized in the sense that the high part represents the full result to the extent of double precision, e.g. the extended-precision number (10, 10) becomes (20, 0) when normalized.