
Alternative Split Functions and Dekker's Product

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Résumé

We introduce algorithms for splitting a positive binary floating-point number into two numbers of around half the system precision, using arithmetic operations all rounded either toward $-\infty$ or toward $+\infty$. We use these algorithms to compute "exact" products (i.e., to express the product of two floating-point numbers as the unevaluated sum of two floating-point numbers, the rounded product and an error term). This is similar to the classical Dekker product, adapted here to directed roundings.

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