

HIGH ACCURACY ESTIMATES OF ELEMENTARY FUNCTIONS

ABSTRACT

An improved method of estimating the square root, reciprocal square root, and reciprocal of an input value in a computer system. The input value, after being normalized, is used to select a pair of constants from a table (200). The constants are based on a linear approximation of the function for each interval of the input value, offset to reduce a maximum error value for a given interval. The estimated function is calculated by adding or subtracting the product of a part of the normalized input value and the first constant from the second constant. In one implementation, the input value is normalized within the range $1 \leq x < 2$, and one lookup table (200) is used, having an interval size of $1/32$. In a further preferred embodiment, only a lower order part of the mantissa is used in the multiply-add operation, to reduce the number of bits required.

Fig 4.