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A New Floating Point Implementation of Base 2 Logarithm

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Abstract : Logarithms reduce products to sums and powers to products; they play an important role in signal processing, communication and information theory. They are primarily used for hardware calculations, handling multiplications, divisions, powers, and roots effectively. There are three commonly used bases for logarithms; the logarithm with base-10 is called the common logarithm, the natural logarithm with base-e and the binary logarithm with base-2. This paper demonstrates different methods of calculation for log2 showing the complexity of each and finds out the most accurate and efficient besides giving insights to their hardware design. We present a new method called Floor Shift for fast calculation of log2, and then we combine this algorithm with Taylor series to improve the accuracy of the output, we illustrate that by using two examples. We finally compare the algorithms and conclude with our remarks.

Keywords : logarithms, log2, floor, iterative, CORDIC, Taylor series
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