

THE PARALLEL EVALUATION OF ARITHMETIC EXPRESSIONS WITHOUT DIVISION

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ABSTRACT

As computers become capable of executing more arithmetic operations simultaneously, the question of compiling for such machines becomes more important. In this correspondence we consider arbitrary arithmetic expressions of n distinct variables with operations restricted to addition, subtraction, and multiplication. We first construct a scheme whereby any such expression can be evaluated in at most $3 \log_2 n + O(1)$ steps if sufficiently many processors are available. We then improve this result and reduce $3 \log_2 n$ to $2.465 \log_2 n$. Finally, we deduce some results that apply when a fixed number of processors is available.

COMMENTS

Only the Abstract is given here. The full paper appeared as [1] and was reprinted in [3, pages 30–35]. For a more general result which allows division, and requires less processors, see [2].

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