Bul.St.Univ.Baia Mare
Seria B, Matematică-Informatică, Vol.VII, Nr.1-2,127-132

On the Efficiency of Lobacevschi-Graeffe's Method for Finding the Polynomial Zeros

by

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Let $f(x) = 0$ be a nonlinear equation. The problem of determining its zeros is a very interesting and important one, existing many methods, iterative or not, see [2] - [4], to do this.

From this point of view, a special case is ocupied by those nonlinear equations in which the function f is an algebraic polynomial one, with real coefficients, which can be solve by usually used methods, but also by special ones. So, in [4] is presented the Lobacevschi-Graeffe's method, which can be easy translated in an serial algorithmic form.

The aim of this paper is to derive the parallel algorithm for this method and to characterise it by speedup, respectively by the efficiency point of view.

To make it possible, we suppose that a MIMD system - an arbitrary number of processors with independent control and arbitrary large memory with unrestricted access is available,(see [5]). Also, one suppose that each processor is capable to perform any of the operations +, -, *, /. The time required for accessing data, storing results and communicating among processors is ignored.

As it is well known, one of the characteristic of a parallel method F_p is the speedup $S(F_p;n)$, i.e.

$$S(F_p;n) = \frac{CP(\tilde{F}_s)}{CP(F_p;n)}$$

where $\bar{F}_s$ is the optimal serial method with regard to the complexity in a given class of such methods,(see [1]), $CP(F_p;n)$ is the complexity of the parallel method F_p and n is the number of processors.

Using the speedup $S(F_p;n)$, a new characteristic for a parallel method is defined, the efficiency :