

Parallel Method for Initial Value Problems for Linear Ordinary Differential Equations: Speed Up Estimation.

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Abstract: Speed up of a new parallel algorithm for solving initial value problems for linear ODEs on large parallel MIMD computers is determined. Arithmetical operations are considered and a time for information interchange is neglected. The determined speed up is evaluated as a ratio between the number of arithmetical operations needed for serial algorithm and the number of arithmetical operations needed for parallel algorithm on large parallel MIMD computers. The used numerical method for solving initial value problems of linear ODEs is the Runge–Kutta method. An optimal number of subintervals (or processors) and an optimal number of equidistant points for one processor are determined if a total interval is subdivided into N equal parts. It is proved the speed up is proportional to $N^{1/2}$. An elementary example, illustrating the idea of the speed up estimation, is given.

Keywords:

AMS Subject Classification: