SOLVING TRIANGULAR SYSTEMS ON A PARALLEL COMPUTER

AHMED H. SAMEH AND RICHARD P. BRENT

Abstract

We present alternative formulations of the algorithms of Chen and Kuck [1] for the parallel solution of triangular systems of linear equations in $O(\log^2 n)$ steps. We consider both the dense and banded cases, and establish bounds on the time and number of processors required. We also give a detailed error analysis, showing that if $\tilde{x}$ is the computed solution of the triangular system $Lx = f$, then it satisfies the equation $(L + \delta L)\tilde{x} = f$, where $\|\delta L\| \le O(n^2 \log n)\varepsilon\kappa^2(L)\|L\|$. Here $\kappa(L)$ is the condition number of L, $\|\cdot\|$ denotes the ∞-norm, and ε is the unit roundoff.

Comments

Only the Abstract is given here. The full paper appeared as [2].

References

1. S. C. Chen and D. J. Kuck, "Time and parallel processor bounds for linear recurrence systems", *IEEE Transactions on Computers* C–24 (1975), 701–717.
2. A. H. Sameh and R. P. Brent, "Solving triangular systems on a parallel computer", *SIAM J. Numerical Analysis* 14 (1977), 1101–1113. MR 56#17026, Zbl 375.65016. Also appeared as Report TR UIUCDCS-R-75-766, Department of Computer Science, University of Illinois, Urbana, Illinois (November 1975), 18 pp. rpb041.

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