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Linear systems solvers for distributed-memory machines with GPU accelerators. (English) Zbl 1452.65002


Summary: This work presents two implementations of linear solvers for distributed-memory machines with GPU accelerators – one based on the Cholesky factorization and one based on the LU factorization with partial pivoting. The routines are developed as part of the Software for Linear Algebra Targeting Exascale (SLATE) package, which represents a sharp departure from the traditional conventions established by legacy packages, such as LAPACK and ScaLAPACK. The article lays out the principles of the new approach, discusses the implementation details, and presents the performance results.

For the entire collection see [Zbl 1435.68044].

MSC:
65-04 Software, source code, etc. for problems pertaining to numerical analysis
65F05 Direct numerical methods for linear systems and matrix inversion
65Y05 Parallel numerical computation
65Y10 Numerical algorithms for specific classes of architectures

Keywords:
linear algebra; distributed memory; linear systems of equations; Cholesky factorization; LU factorization; GPU acceleration

Software:
Slate; LAPACK; ScaLAPACK

Full Text: DOI

References:


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