

Scalability, Portability, and Numerical Stability in Many-core Parallel Libraries

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The rise of heterogeneous computing has significantly boosted the pace of progress in numeric methods, algorithm design and programming techniques for developing scalable applications. However, there has been a lack of practical languages and compilers in this movement. In preparation of petascale applications for deployment on Blue Waters, we see critical needs in these areas. I will discuss some recent progress in developing scalable, portable, and numerically stable libraries today and several important research opportunities. I will also review some recent advancement in languages and compilers for developing scalable numerical libraries.

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