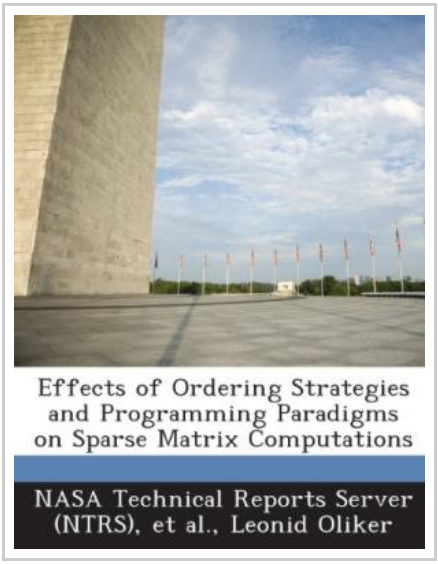




# Effects of Ordering Strategies and Programming Paradigms on Sparse Matrix Computations

By Leonid Oliker

BiblioGov. Paperback. Book Condition: New. This item is printed on demand. Paperback. 24 pages. Dimensions: 9.7in. x 7.4in. x 0.1in.The Conjugate Gradient (CG) algorithm is perhaps the best-known iterative technique to solve sparse linear systems that are symmetric and positive definite. For systems that are ill-conditioned, it is often necessary to use a preconditioning technique. In this paper, we investigate the effects of various ordering and partitioning strategies on the performance of parallel CG and ILU(O) preconditioned CG (PCG) using different programming paradigms and architectures. Results show that for this class of applications: ordering significantly improves overall performance on both distributed and distributed shared-memory systems, that cache reuse may be more important than reducing communication, that it is possible to achieve message-passing performance using shared-memory constructs through careful data ordering and distribution, and that a hybrid MPIOpenMP paradigm increases programming complexity with little performance gains. A implementation of CG on the Cray MTA does not require special ordering or partitioning to obtain high efficiency and scalability, giving it a distinct advantage for adaptive applications; however, it shows limited scalability for PCG due to a lack of thread level parallelism. This item ships from La Vergne,TN. Paperback.



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