World Academy of Science, Engineering and Technology
International Journal of Physical and Mathematical Sciences
Vol:10, No:04, 2016

Signs-Only Compressed Row Storage Format for Exact Diagonalization Study of Quantum Fermionic Models

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Abstract : The present paper describes a high-performance parallel realization of an exact diagonalization solver for quantum-electron models in a shared memory computing system. The proposed algorithm contains a storage format for efficient computing eigenvalues and eigenvectors of a quantum electron Hamiltonian matrix. The results of the test calculations carried out for 15 sites Hubbard model demonstrate reduction in the required memory and good multiprocessor scalability, while maintaining performance of the same order as compressed row storage.

Keywords : sparse matrix, compressed format, Hubbard model, Anderson model
Conference Title : ICCP 2016 : International Conference on Computational Physics
Conference Location : Boston, United States
Conference Dates : April 25-26, 2016