

Joint CQSE and CASTS Seminar

Weekly Seminar
Jan. 8, 2016 (Friday)

TIME Jan. 8, 2016, 14:30 ~ 15:30
TITLE Sparse Linear Systems Solvers on GPU
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Abstract

Solving large and sparse linear systems are kernels of computational sciences and engineering. How can the many-core accelerators GPU benefit the linear system solvers? We address this question by presenting some of our results. For a computer equipped with a single GPU, we study how multifrontal method can be accelerated on such computer and how the workloads can be distributed on CPU or GPU to achieve near optimal timing performance. For parallel heterogeneous computers composed by multiple computing nodes and multiple GPUs per node, we develop a Hierarchical Schur method (HiS) aiming at achieve better scalability. In the first stage of the HiS, the coefficient matrix is decomposed into a set of sub-matrices that can be factorized simultaneously. In the second stage of the HiS, the remaining Schur complement linear system must be solved. We discuss how this Schur system can be solved by direct or iterative methods on the GPU cluster efficiently. This is a joint work with Cheng-Han Du, Pochuan Wang, Chenhan D. Yu, and Cheming Tsu.

