Numerical Analysis and Scientific Computing Seminar

Recent Development of Multigrid Solvers in HYPRE on Modern Heterogeneous Computing Platforms

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Abstract: Modern many-core processors such as the graphics processing units (GPUs) are becoming an integral part of many high performance computing systems nowadays. These processors yield enormous raw processing power in the form of massive SIMD parallelism. Accelerating multigrid methods on GPUs has drawn a lot of research attention in recent years. For instance, in recent releases of the HYPRE package, the structured multigrid solvers (SMG, PFMG) have full GPU-support for both the setup and the solve phases, whereas the algebraic multigrid (AMG) solver, namely BoomerAMG, has only its solve phase been ported and the setup can still be computed on CPUs only. In this talk, we will provide an overview of the available GPU-acceleration in HYPRE and present our current work on the algorithms in the AMG setup that are suitable for GPUs including the parallel coarsening algorithms, the interpolation methods and the triple-matrix multiplications. The recent results as well as the future work will also be included.

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https://emory.zoom.us/j/313230176

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