Parallel GMRES with Futures and Promises

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Abstract. The exponential growth of available FLOPS requires the development of more sophisticated programming tools enabling significantly improved application efficiency and scalability on current and future architectures. We investigate the new execution model ParalleX, which defines a work queue based, message driven, fine grain parallelization scheme based on a global address space for highly asynchronous calculations. This paper uses HPX, a C++ library implementing the ParalleX execution model, to realize the GMRES operation from BLAS. *Futures*, a mechanism of asynchrony supported by ParalleX, are used to expose parallelism in our implementation. We examine the performance of this new HPX GMRES code, relative to conventional parallel GMRES implementations.