

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Wednesday, 7 November 2017, 10:00 a.m.

Special time

Room 617 Wachman Hall

Asynchronator - A software library for asynchronous methods

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Abstract. In parallel environments, asynchronous solvers sacrifice convergence and generality for scalability, fault and latency tolerance. At current scales these methods are viable as preconditioners. They are especially useful when there is inherent load imbalance as they eliminate processor idle time. Their intrinsic latency tolerance makes them particularly suited for heterogeneous environments as well as future exascale machines.

In this work we present an open-source hybrid parallel library written in C++(11/14). The library implements asynchronous variants of Jacobi and Block-Jacobi methods, both as stand-alone solvers and as preconditioners for FCG and FGMRES. The solvers are tested on several finite-difference problems using a general D-dimensional stencil operator. We discuss different approaches in implementing asynchronous solvers on supercomputers and present two new asynchronous methods: OSISC (Overlapped Synchronously Iterating Synchronously Communicating) method and AISC (Asynchronously Iterating Synchronously Communicating) method.

(joint work with Andreas Frommer)