

TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Thursday, 21 June 2018, 4:00 p.m.
Room 617 Wachman Hall
(refreshments and social at 3:45 p.m)

Chaotic Iterations of Parallel Iterative Domain Decomposition Methods

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Abstract. Existing numerical algorithms face their limits when running on a large number of cores. For instance, parallel iterative methods meet serious scalability limitation due to the synchronization procedure occurring between the processors at the end of each iteration. The traditional scheme for parallel iterative algorithms is synchronous iterations. This describes a method where a new iteration is only started when all the data from the previous one has been received. These iterative algorithms have been widely studied and are often simply called parallel iterative algorithms, synchronous being omitted. Another kind of iterative scheme, called chaotic iterations, can help solve these scalability problems.

This talk shows how iterative domain decomposition methods have efficiently evolved over the years. In order to use such methods on massive parallel computers, the iterative scheme should be modified, and chaotic iterations are here proposed for the solution strategy of the interface problem, leading to some convergence difficulties. After the presentation of the methods and their convergence analysis, numerical experiments are performed in parallel on large scale engineering problems to illustrate the robustness and efficiency of the proposed method.