TEMPLE UNIVERSITY
Department of Mathematics

Applied Mathematics and Scientific Computing Seminar

Wednesday, 18 October 2017, 4:00 p.m.
Room 617 Wachman Hall

(refreshments and social at 3:45 p.m)

Resilience Analysis for Multigrid Methods

by Christian Glusa
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Abstract. With the the advent of exascale computing expected within the next few years, the number of components in a system will continue to grow. The error rate per individual component is unlikely to improve, however, meaning that future high performance computing will be faced with faults occurring at significantly higher rates than present day installations. Therefore, the resilience properties of numerical methods will become important factors in both the choice of algorithm and in its analysis. In this talk we present a framework for the analysis of linear iterative methods in a fault-prone environment. The effects of random node failures and bit flips are taken into account through a probabilistic model involving random diagonal matrices. Using this model, we analyze the behavior of two- and multigrid methods. Both analytic convergence estimates for these methods and simulation results will be discussed. (This is joint work with Mark Ainsworth).