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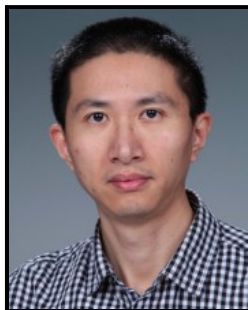## Events

Current Events
Lectures▼
Events Archive▼

Computational Mathematics Seminar Series

Fast Multilevel Solvers for Discrete Fourth Order Parabolic Problems

Bin Zheng, Pacific Northwest National Laboratory

Digital Media Center 1034
March 31, 2015 - 03:30 pm

Abstract:

In this work, we study fast iterative solvers for the solution of fourth order parabolic equations discretized by mixed finite element method. We propose to use consistent mass matrix in the discretization and use lumped mass matrix to construct efficient preconditioners. We provide eigenvalue analysis for the preconditioned system and estimate the convergence rate of the preconditioned GMRes method. Furthermore, we show these preconditioners only need to be solved inexactly by optimal multigrid algorithms. We also investigate the performance of multigrid algorithms with either collective smoothers or distributive smoothers when solving the preconditioner systems. Our numerical examples indicate the proposed preconditioners are very efficient and robust with respect to both discretization parameters and diffusion coefficients.

Speaker's Bio:

Bin Zheng is a staff scientist in the Computational Mathematics group at Pacific Northwest National Laboratory (PNNL). He earned his Ph.D. in mathematics from Pennsylvania State University in 2008 and studied finite element methods for high order partial differential equations. He then spent a few years as a postdoc at University of Maryland, Brown University, and PNNL. Bin's research interests are mainly focused on the design and analysis of numerical methods for partial differential equations, including discretization schemes and fast iterative solvers.

This lecture has a reception @ 03:00 pm