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Special Guest Lectures

PHG: A Parallel Adaptive Finite Element Toolbox and its Applications**Tao Cui, Chinese Academy of Sciences**

Assistant Professor, Computational Mathematics

Johnston Hall 338

February 23, 2012 - 02:30 pm

Abstract:

PHG is a toolbox for developing parallel adaptive finite element programs. PHG is currently under active development at State Key Laboratory of Scientific and Engineering Computing of Chinese Academy of Sciences. PHG deals with conforming tetrahedral meshes and uses bisection for adaptive local mesh refinement and MPI for message passing. PHG has an object oriented design which hides parallelization details and provides common operations on meshes and finite element functions in an abstract way, allowing the users to concentrate on their numerical algorithms. Now, PHG has been used for modeling in all of these areas: Computational Electromagnetics, Structural Mechanics, CFD, Glaciers, Material Science, Semiconductors and Quantum computing. In this lecture, the main algorithms in PHG will be introduced and some numerical results with up to 1 billion unknowns and using up to more than 12288 CPU cores are presented to demonstrate that PHG is robust and scalable.

Speaker's Bio:

Tao Cui received the Ph.D. degree in computational mathematics from the Academy of Mathematics and Systems Science, Chinese Academy of Sciences in 2009. He joined the Institute of Computational Mathematics, Chinese Academy of Sciences as an assistant professor since 2009. His research interests include adaptive finite element method, parallel computing and computational electromagnetics.

