

1100-65-363

Michael Holst, Sara Pollock and Yunrong Zhu* (zhuyunr@isu.edu), Mathematics
Department, Idaho State University, 921 S. 8th Ave, Stop 8085, Pocatello, ID 83209-8085.

Convergence Analysis of Goal-Oriented Adaptive Finite Element Method for Semilinear PDE.

In this talk, we develop convergence theory for a class of goal-oriented adaptive finite element (GOFEM) algorithms for second order semilinear elliptic equations. One of the main challenges in the nonlinear problem that we don't see in the linear case is the dependence of the dual problem on the exact solution. As it is not practical to work with a dual problem we can not compute, we develop a practical adaptive algorithm in which the mesh refinement is driven both by residual-based estimator for the approximation of the primal solution, and in a sequence of approximate dual problems which relies only on the numerical solution obtained from the previous step. We show the contraction of the adaptive finite element algorithm. Numerical experiments support the theoretical results. (Received February 10, 2014)