

1106-65-106

Hailong Guo*, 1150 Faculty/Administration Building, 656 W. K, Detroit, MI 48202, and
Zhimin Zhang and **Ren Zhao**. *Hessian Recovery for Finite Element Methods*.

In this article, we propose and analyze an effective Hessian recovery strategy for the Lagrangian finite element method of arbitrary order. We prove that the proposed Hessian recovery method preserves polynomials of degree $k+1$ on general unstructured meshes and achieve $k+1$ order superconvergence on mildly structured meshes. In addition, the method is proven to be ultraconvergent (two order higher) for translation invariant finite element space of any order. Numerical examples are presented to support our theoretical results. (Received July 16, 2014)