

1046-65-795

Xiaoming He* (xiaoming@vt.edu), Department of Mathematics, Virginia Tech, Blacksburg, VA 24061, **Tao Lin** (tlin@vt.edu), Department of Mathematics, Virginia Tech, Blacksburg, VA 24061, and **Yanping Lin** (yanlin@ualberta.ca), Department of Mathematical and Statistics Sci, Edmonton, AB T6G 2G1, Canada. *A system of bilinear immersed finite elements.*

This presentation discusses a bilinear immersed finite element(IFE) space for solving second order elliptic boundary value problems with discontinuous coefficients (interface problem). This is a nonconforming finite element space and its partition can be independent of the interface. The error estimates for the interpolation of a Sobolev function indicate that this IFE space has the usual approximation capability expected from bilinear polynomials. Then this space is implemented to Galerkin method, finite volume element method and discontinuous Galerkin method. Numerical examples show that these methods have the same optimal convergence rates as those with standard bilinear finite elements. Some convergence analysis about these methods is also provided. In a word, we are trying to build a system of bilinear IFE which is similar to that of standard finite elements. Hopefully this system can be a solid base for the future work about IFE and its application. (Received September 11, 2008)