

RECENT DEVELOPMENT OF IMMERSSED FEM FOR ELLIPTIC AND ELASTICITY INTERFACE PROBLEMS

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ABSTRACT

In this talk, we review some recent progress in using structured grid finite element method for interface problems. Many practical engineering problems have some kind of material interface along which material parameters are discontinuous. Conventional methods until early 21th century, most algorithms used fitted grid to resolve the smooth interface. However, since the appearance of XFEM (98), there have arisen several version of finite element method using grids independent of interface. Among them we are going to give some survey of methods suggested by Z. Li, T. Lin and Y. Lin and later developed the author group, called IFEM(IFE). The basic idea behind it is to use a modified basis function so that it satisfies the flux condition along the interface. Instead, what we lose is the consistency along the edges. These consistency terms are compensated by the DG kind of idea later. We explain P_1 conforming based method, P_1 nonconforming based method with application to mixed finite element methods. We will also introduce the case of non homogenous jumps, Robin type of jumps, and the space for vector equations together with rigorous error analysis.