A Weak Formulation for solving Elliptic and Elasticity Interface Problems

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Interface problems occur in many multi-physics and multi-phase applications in science and engineering. An accurate and efficient method is desired. In the past decades several numerical methods have been proposed such as the immersed boundary method, the immersed interface method and the matched interface and boundary method. We proposed a non-traditional finite element method for solving elliptic and elasticity interface problems using non-body-fitted mesh. Some theoretical discussions and numerical studies are presented in both 2D and 3D.