

ϕ -FEM: AN OPTIMALLY CONVERGENT AND EASILY IMPLEMENTABLE IMMERSED BOUNDARY METHOD FOR PARTICULATE FLOWS AND STOKES EQUATIONS

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ABSTRACT. In this talk, we will present an immersed boundary method to simulate the creeping motion of a rigid particle in a fluid described by the Stokes equations discretized thanks to a finite element strategy on unfitted meshes, called ϕ -FEM, that uses the description of the solid with a level-set function. One of the advantages of our method is the use of standard finite element spaces and classical integration tools, while maintaining the optimal convergence (theoretically in the H^1 norm for the velocity and L^2 for pressure; numerically also in the L^2 norm for the velocity). We will finish with some numerical illustrations.

Keywords: Finite element method, numerical analysis, fictitious domain, immersed boundary method, level-set

Mathematics Subject Classifications (2010): 65N30, 65N85, 65N15

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