Local mass conservation for the finite element immerse boundary method

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The aim of this talk is to discuss the performances of different finite elements in the space discretization of the Finite Element Immersed Boundary Method. In this exploration we will analyze two popular solution spaces: *Hood-Taylor* and *Bercovier-Pironneau* (P1-iso-P2). Immersed boundary solution is characterized by pressure discontinuities at fluid structure interface. Due to such a discontinuity a natural enrichment choice is to add piecewise constant functions to the pressure space. Results show that $P_1 + P_0$ pressure spaces are a significant cure for the well known "boundary leakage" affecting IBM. We refer to[4] for a review on the original IBM and to [1, 2, 3] for its finite element discretization. Convergence analysis is performed, showing how the discontinuity in the pressure is affecting the convergence rate for our finite element approximation.

References

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