

A Fluid-Structure Interaction Method Using X-FEM and a Level-set Method

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We propose in this paper a method based on the eXtended Finite Element Method [3] and a level-set method [4] for fluid dynamics problems of moving interfaces. In particular we consider problems of fluid structure interaction in regimes where viscosity has negligible effects [1] [2]. Such problems involve discontinuities at the interface in the velocity field and the gradient field. The level-set can track the shape of the structure and X-FEM is able to take into account the discontinuity in the tangential velocity field around the structure. The level-set is represented by the same element mesh as the velocity field, and it is updated by an evolution equation. An advantage is that the mesh does not need to follow the structure because it has not to conform to the interface. Applications to three dimensional axisymmetric problems are presented.

References

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