

A FICTITIOUS DOMAIN APPROACH FOR THE FINITE ELEMENT DISCRETIZATION OF FSI

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ABSTRACT. We recall a finite element version of the Immersed Boundary Method (FE-IBM) which, thanks the introduction of a Lagrange multiplier, can be considered as a Fictitious Domain formulation for FSI. The main advantage of this scheme is that it allows to use totally independent meshes for fluid and solid so that the Eulerian framework can be used in the fluid domain while for the solid the more convenient Lagrangian description can be applied. This technique has been extended to cover also the case of compressible solids.

In particular, we present some results on the stability of the monolithic scheme as well as of a time splitting approach. We show theoretical and numerical results on error estimates both in space and time, including higher order time advancing schemes.

Moreover, we shall discuss some computational aspects related with the evaluation of the matrix elements coupling the two meshes.

The results presented in this talk have been obtained in collaboration with Daniele Boffi, Luca Heltai, Nicola Cavallini, Miguel A. Fernandez, Michele Annese and Sebastian Wolf.

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