

# A FICTITIOUS DOMAIN APPROACH TO THE FLUID-STRUCTURE INTERACTION PROBLEM WITH COMPRESSIBLE SOLIDS

Daniele Boffi<sup>1</sup>, Lucia Gastaldi<sup>2</sup> and Luca Heltai<sup>3</sup>

<sup>1</sup> University of Pavia, Dipartimento di Matematica, via Ferrata 1 - 27100 Pavia, Italy,  
daniele.boffi@unipv.it, <http://www-dimat.unipv.it/boffi/>

<sup>2</sup> University of Brescia, DICATAM, Via Branze 43 - 25123 Brescia, Italy ,  
lucia.gastaldi@unibs.it, <http://lucia-gastaldi.unibs.it>

<sup>3</sup> SISSA, via Bonomea 265 - 34136 Trieste, Italy, luca.heltai@sissa.it,  
<http://people.sissa.it/heltai>

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We consider the coupling of incompressible fluids with compressible solids. The finite element discretization of the immersed Boundary Method was introduced in [2] and later on, it was extended to the case of thick solids in [3]. In these papers, the solid was assumed to be incompressible. More recently, new formulations have been introduced in order to deal with the body motion constraint in a completely variational framework. The approach presented in [4] is applicable to immersed bodies of general topological and constitutive characteristic and includes the case of compressible solids. The action of force exerted by the fluid on the solid and vice versa was taken into account by interpolation operators between fluid and solid discrete spaces which guarantee semi-discrete stability estimates. In [1], it was proposed to use Lagrange multipliers to enforce the coupling constraint between fluid and solid, providing a fully discrete method unconditionally stable. Here we present the generalization of the Lagrange multiplier approach to deal with compressible solids and show energy estimates. Validation tests demonstrate the capability of the model to take into account fluid structure interaction between compressible solids and incompressible fluids.

## REFERENCES

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