

Embedded solvers for FSI problems

Riccardo Rossi*, Antonia Larese*, Pooyan Dadvand*, Jordi Cotela*

Roland Wüchner†, Hosam Al Sofi†

* International Center for Numerical Methods in Engineering (CIMNE)
Universidad Politécnic de Cataluña
Campus Norte UPC, 08034 Barcelona, Spain
e-mail: rrossi@cimne.upc.edu, web page: <http://www.cimne.com>

† Chair of Structural Analysis,
Technische Universität München
Arcisstr. 21
D-80333 München

ABSTRACT

The simulation of Fluid Structure Interaction (FSI) problems requires by its very nature taking into account relevant displacements of solids within a fluid domain. While “small” deformations can be conveniently represented by Arbitrary Lagrangian Eulerian (ALE) techniques, such approaches fail when facing large deformations. One possible solution is the use of “Embedded Solvers” which essentially consist in embedding an approximation of the geometry within the fluid discretization so that such information can be taken into account while solving the fluid problem.

Current work focuses on the implementation of one of such Embedded approaches in the context of Variational Multi Scale (VMS) techniques. We will show how this technique can be employed to perform effectively fully coupled LES-like simulations. The method is completed by the use of the parallel adaptive refinement strategy described in [1].

The method is evaluated in application to a real deformable structure for which experimental results are available.

REFERENCES

- [1] R Rossi, J Cotela, NM Lafontaine, P Dadvand, SR Idelsohn, *Parallel adaptive mesh refinement for incompressible flow problems*, Computers & Fluids 80, 342-355

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