Norm-oriented mesh adaptive fluid-structure interaction : Abstract for the VI International Conference on Computational Methods for Coupled Problems in Science and Engineering – Coupled Problems 2015

Eleonore Gauci*, Frederic Alauzet†, Adrien Loseille† and Alain Dervieux*

* INRIA, Sophia-Antipolis, 2004 route des Lucioles, France
e-mail: Eleonore.Gauci@inria.fr, Alain.Dervieux@inria.fr

† INRIA, Domaine de Voluceau, 78153 Le Chesnay, France
e-mail: Frederic.Alauzet@inria.fr, Adrien.Loseille@inria.fr

ABSTRACT

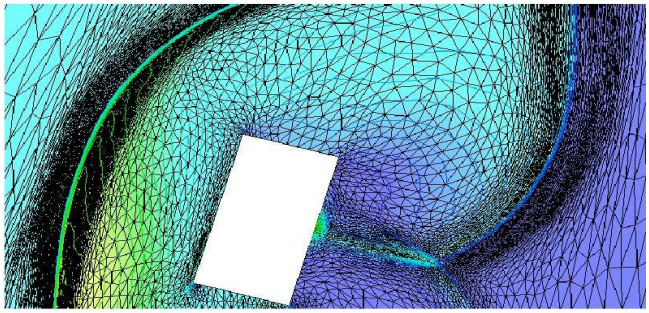
The proposed communication discusses about two novelties in the mesh adaption for a coupled fluid-structure unsteady simulation.

First, the mesh adaption problem is set into a well posed problem: find the continuous metric which minimizes the norm of the deviation |u-uM|. The simulation involves the calculation of the so-called corrector, an approximation of u-uM. The corrector is computed from the evaluation of the equation residual on a just finer mesh. This evaluation is transfered on the current mesh and an error equation is solved giving the corrector. From the corrector is computed an adjoint state. The mesh adaptation criterion is completed by an a priori estimate. This method has been derived first for elliptic models in [1].

Second, a novel interpretation of the continuous metric permits a better adaptation. Indeed, not only the metric is used for building a highly stretched adapted mesh, but also, from the spatial variation of the metric, we extract a curvature for the mesh. The curvature is taken into account in the integration of the vertex-centered upwind scheme.

These methods are introduced in a global unsteady fixed point adaptation algorithm [2].

Preliminary aplications to blast-wave/solide interaction (Fig.) will be completed by applications with blunt solids putting in evidence the interest of the novel curvature feature.



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