A SPACETIME GOAL ORIENTED ADAPTIVITY FOR AN EXPLICIT IN TIME FINITE ELEMENT METHOD

PAULINA SEPÚLVEDA AND DAVID PARDO

Abstract. One of the most common techniques for solving time dependent problems is based on a semi-discretization using a finite element or a finite different discretization in space, and solving in time by a time-stepping technique based on finite differences. The resulting methods are called explicit if one can advance in time without solving a global problem in space and turn out to be computationally efficient. However, when solving a large time-dependent problem, adaptive mesh refinement schemes become an important tool to obtain efficient numerical simulations. Mantaining the explicit-in-time method while designing a spacetime adaptive mesh refinement scheme still remains a difficult task partially due to strong stability constrains that arise from time stepping methods.

In this talk, based on the work of [1], we propose a new spacetime adaptive mesh refinement technique for an explicit-in-time finite element method, using the refinement strategies introduced in [3] and explicit in time basis functions corresponding to explicit schemes (as shown in [2]). Numerical results for the linear transport equation will be presented.

Keywords: finite elements, mesh generation and refinement

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Basque Center for Applied Mathematics (BCAM)
E-mail address: psepulveda@bcamath.org

University of the Basque Country (UPV/EHU), BCAM, and Ikerbasque
E-mail address: dzubiaur@gmail.com