

DIFTA

24 September 2002

09:00 – 10:00 in EL-1

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Parareal in time simulation with domain decomposition for PDE

Abstract: Numerical simulation of time dependent partial differential equations on complex geometries is more than ever a challenging task. In a context of fast increasing both the CPU power available on typical workstations and of the number of computers that can be connected through high speed networks, the difficulty resides rather in how to obtain "real time solutions" than in the amount of CPU power available (which becomes to exceed the needs). In this direction, domain decomposition and splitting techniques is interesting but not enough.

In this context, the "parareal" algorithm that parallelize **in the time direction** the work required to solve the evolution equations has been introduced in previous works. This method is based on the alternative use of coarse global sequential solvers with fine local parallel ones. The nice feature of this algorithm is that it combines nicely with standard domain decomposition algorithms.

Applications to control of phenomenon governed by parabolic type equations can also be investigated and proves very advantageous.

We shall present here the basics of this technique and of its analysis. We shall illustrate its properties through numerical experiments.