

First order least squares methods for parabolic and instationary Stokes equations

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Abstract

This presentation is about the numerical solution of parabolic PDEs. Instead of the common time marching schemes we will consider a monolithic approach based on simultaneous space-time variational formulation of the PDE. Advantages of this approach are that they produce numerical approximations from the employed trial spaces that are quasi-best, allow for local refinements simultaneously in space and time, and their much better suitability for a massively parallel implementation. Moreover, as we will illustrate, they are superior in applications where the full time evolution is needed at the same time, as with problems of optimal control or data assimilation. If time permits, then we discuss the generalisation of this approach to the instationary Stokes equations.

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