



Journal of Complexity

Call for Papers for Special Issue

Space-Time Adaptive Numerical Schemes for Parabolic Partial Differential Equations

Most problems in science and technology are modelled by partial differential equations (PDEs). A very important subclass are parabolic PDEs which describe diffusion phenomena in their broadest sense.

Usually, analytic expressions of the solutions are not available, so that numerical schemes for their constructive approximation are needed. Traditionally, for parabolic PDEs two basic approaches exist: discretize first in space, then in time (vertical method of lines), or the other way around (first in time, then in space, horizontal method of lines). Both methods have their advantages and drawbacks. In recent years, much effort has been spent to combine these methods and to work directly in the space-time cylinder. These kinds of methods are in the focus of this special issue. In any case, for realistic problems the numerical treatment requires the management of a huge amount of data, so that adaptive schemes are often unavoidable. It is the goal of this special issue to describe the state of the art concerning adaptive space-time methods for parabolic PDEs. In particular, papers from different communities (finite elements, wavelets, boundary elements, finite differences, quarklets, just to name of few) are welcome.

Papers devoted to the complexity and optimality of algorithms are very much appreciated. Manuscripts concerning the theoretical foundation of adaptive space-time methods are also welcome. Numerical experiments confining the theoretical findings are highly valued, however, purely computational studies are out of the scope of the issue.

We are looking forward to receive your contribution!

Guest editors:

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- Thorsten Raasch (University of Siegen, Germany)
- Olaf Steinbach (Technical University of Graz, Austria)

Deadline for manuscript submissions: **November 1, 2023**

Submissions: online, via https://ef.msp.org/submit_new.php?j=els_joc