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Adaptivity and memory-reduced adjoints for optimization problems with parabolic PDE-constraints

Design and Convergence Analysis of a Time Adaptive Finite Element Method

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Abstract: We present an adaptive fully discrete space-time finite element method for the heat equation. The algorithm is based on a classical adaptive time-stepping scheme supplemented by an additional control of a potential energy increase of the discrete solution originating from coarsening of the spatial meshes. We present a new marking strategy that show improved convergence speed compared to classical time-stepping schemes since too small time-steps are avoided.

This is joint work with Christian Kreuzer (Bochum) and Kunibert G. Siebert (Stuttgart).