On space-time analysis of parabolic problems on tensor product meshes

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In this talk we will focus on parabolic initial-boundary value problems with varying regularity in the initial data. As is known for time stepping methods, rough initial data can lead to oscillations of the finite element solution and needs to be treated using adapted strategies, e.g., geometric warm-up or mixed time stepping schemes. We will discuss space-time variational formulations for the incorporation of the initial data in both a strong and ultra-weak sense in time. Using tensor product meshes, we will derive finite element error estimates that highlight the advantages and limitations of each formulation. Numerical examples will complement the theoretical findings.

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