

Implicit-Explicit Time Stepping with Spatial Discontinuous Finite Elements

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In this talk a combination of discontinuous, piecewise linear, finite elements with implicit-explicit time stepping is considered for convection-reaction equations. Combined with low order quadrature rules, this leads to convenient schemes. We shall analyze the effect of such low order quadrature rules on accuracy and stability for one-dimensional problems. The implicit-explicit time stepping is based on the well-known BDF2 method which allows for stiffness in the reaction terms.

The main interest of discontinuous finite elements is to provide locally conservative schemes in a finite element framework, with the possibility to enforce monotonicity and TVD properties by limiting. In the talk also attention will be given to the TVD property of the temporal discretizations.