Solution of convection–diffusion equations with adaptive methods of higher order in space and time

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Abstract

This thesis deals with solution of scalar nonlinear convection–diffusion equation with aid of discontinuous Galerkin method. It's aim is to implement an adaptive choice of time step. To do this, we derived 2 sufficiently stable methods for solution of systems of ordinary differential equations obtained by space semidicretization, which is carried out by the discontinuous Galerkin method. Using those two approximate solutions, we estimate local error of discretization. Using it, we are able to choose following time step in such way, that local error is approximately equal to given tolerance. Several numerical simulations were carried out to check properties of this method.

References

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