

## Variational time discretisations for unsteady convection-diffusion equations

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We will give an overview on variational time discretisation methods for unsteady convection-diffusions equations. In particular, the discontinuous Galerkin method (dG) and the continuous Galerkin-Petrov method (cGP) will be considered. Both classes allow to construct A-stable time discretisations of arbitrarily high order.

A comparison of both classes concerning the order of convergence, stability properties and computational costs will be presented. Moreover, we discuss the superconvergence of both types of methods at the discrete time points.

Furthermore, the idea of a new C1GP(r)-method will be presented. One feature of this method is that the discrete solution satisfies the unsteady convection-diffusion equation at the discrete time points exactly. Moreover, the close relation to the cGP(r-1)-method will be shown.

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