# Finite Element Methods for Transient Convection-Diffusion-Reaction Equations

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An application of time–dependent convection–diffusion–reaction equations is the simulation of a chemical reaction in a flow field. Such reactions are modeled via a coupled system of nonlinear convection–diffusion–reaction equations for the concentrations of the reactants and the products. To simulate such a process, a method is needed that is on the one hand able to compute sharp layers and which on the other hand prevents the occurence of spurious oscillations. We have studied the Streamline–Upwind Petrov–Galerkin (SUPG) method for several parameters, different Spurious Oscillations at Layers Diminishing (SOLD) methods, a Local Projection Stabilization (LPS) scheme and two Finite Element Method Flux–Corrected–Transport (FEM–FCT) methods to identify methods which fulfil these requirements.

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