

Finite element solutions of convection-diffusion equations with one-level local projection stabilization method

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In many fluid flows such as thermal flows and two-phase flows with surfactants, the solution of a scalar convection-diffusion equation is needed in the discretisation of Navier-Stokes equations. Therefore, an accurate and stable discrete solution of the scalar equation is required. However, often these scalar equations are convection dominated, and it is well known that the standard Galerkin finite element discretization for these equations will produce spurious oscillations in the discrete solution. Thus, stabilization methods are used to suppress the spurious oscillations. In this talk, we present the numerical results for interior and boundary layer problems which are obtained with different variants of one-level local projection stabilization method. We assess the accuracy and the robustness of the local projection stabilization for these problems.