

Space–time discretisations for linear hyperbolic systems

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Abstract: We introduce space–time discretizations for linear hyperbolic systems using discontinuous Galerkin (DG) approximation in space and Petrov–Galerkin ansatz in time. For the DG method, the upwind flux is evaluated by explicitly solving a Riemann problem. We show well–posedness and convergence of the discrete system. Based on goal–oriented dual–weighted error estimation an adaptive strategy is introduced. The full space–time linear system is solved using GMRES with a parallel multilevel preconditioner. Some numerical experiments illustrate the efficiency of the overall adaptive solution process.

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