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Exactly divergence-free discontinuous Galerkin methods for incompressible fluid flow

We present a class of discontinuous Galerkin methods for the incompressible Navier–Stokes equations yielding exactly divergence-free velocity approximations. Exact incompressibility is achieved by using divergence-conforming velocity spaces for the approximation of the velocities. The resulting methods are also locally conservative and energy-stable. We discuss the numerical analysis of the methods and illustrate their practical performance in a series of numerical experiments.