

Non-Polynomial Discontinuous Galerkin Discretization for Navier-Stokes Problems

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We aim to develop a flexible numerical method to simulate the Navier-Stokes equations, with a low kinematic viscosity ν . To this end, we propose a discontinuous Galerkin SIP method, using local exponential basis. This discretization choice is inspired by the exact solution of the one-dimensional advection-diffusion problem.

Concerning the advection-diffusion problem, the basis functions depend on the advection field. We provide 2D simulations showing an improvement in accuracy and a reduction in numerical oscillations, compared to the use of polynomial basis functions. We also provide 2D simulations for Oseen problem. The study of the Navier-Stokes problem is ongoing.

References:

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