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Título: New avenues in high order fluid dynamics

Abstract: We present the latest developments of our High-Order Spectral Element Solver (HORSES3D), an open source high-order discontinuous Galerkin framework capable of solving a variety of flow applications, including compressible flows (with or without shocks), incompressible flows, various RANS and LES turbulence models, particle dynamics, multiphase flows, and aeroacoustics [1].

Recent developments allow us to simulate challenging multiphysics including turbulent flows, multiphase and moving bodies, using local p-adaptation and fast multigrid time advancement. In addition, we present recent work that couples Machine Learning techniques and high order simulations.

[1] E Ferrer, G Rubio, G Ntoukas, W Laskowski, O Mariño, S Colombo, A. Mateo-Gabín, H Narbona, F Manrique de Lara, D Huergo, J Manzanero, AM Rueda-Ramírez, DA Kopriva, E Valero, HORSES3D: a high order discontinuous Galerkin solver for flow simulations and multi-physic applications. In Press Computer Physics Communications, 2022