Tuesday, October 2nd, 16:00-17:00

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ENERGY STABLE BOUNDARY CONDITIONS FOR THE NONLINEAR INCOMPRESSIBLE NAVIER-STOKES EQUATIONS

The nonlinear incompressible Navier-Stokes equations with different types of boundary conditions at far fields and solid walls is considered. Two different formulations of boundary conditions are derived using the energy method. Both formulations are implemented in both strong and weak form and lead to an estimate of the velocity field.

Equipped with energy bounding boundary conditions, the problem is approximated by using discrete derivative operators on summation-by-parts form and weak boundary and initial conditions. By mimicking the continuous analysis, the resulting semi-discrete as well as fully discrete scheme are shown to be provably stable, divergence free and high-order accurate.