Title : Pressure recovery in ROM for incompressible flows

Abstract :

We introduce a method to recover reduced pressure in Reduced Order Models (ROMs) for incompressible flows. The pressure is obtained as the least-squares minimizer of the reduced velocity residual in a dual norm, with uniqueness guaranteed under inf-sup stability of the full-order spaces. The method is equivalent to solving the reduced mixed problem with a velocity basis enriched by supremizers. We establish optimal error estimates for incompressible flow equations, including the transient Navier–Stokes case, and validate the approach with flow past a cylinder and lid-driven cavity benchmarks. The results confirm theoretical predictions and show faster convergence than existing pressure recovery techniques. An extension to penalty formulations is also presented.