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Computationally efficient modular nonlinear filter stabilization for high Reynolds number flows. Preliminary report.

The nonlinear filter based stabilization proposed by (Modular nonlinear filter stabilization of methods for higher Reynolds numbers flow, JMFM 14 (2), 325-354) allows to incorporate an eddy viscosity model into an existing laminar flow codes in a modular way. However, the proposed nonlinear filtering step requires the assembly of the associated matrix at each time step and solving a linear system with an indefinite matrix. We propose computationally efficient version of the filtering step that only requires the assembly once, and the solution of two symmetric, positive definite systems at each time step. We also test a new indicator function based on the entropy viscosity model. (Received January 06, 2017)