

Augmenting the grad-div stabilization for Taylor-Hood finite elements with a vorticity stabilization

Marwa Zainelabdeen¹ Volker John² Christian Merdon³

The least squares vorticity stabilization (LSVS), proposed in [2] for the Scott-Vogelius finite element discretization of the Oseen equations, is studied as an augmentation of the popular grad-div stabilized Taylor-Hood pair of spaces. An error analysis is presented which exploits the situation that the velocity spaces of Scott-Vogelius and Taylor-Hood are identical. Convection-robust error bounds are derived under the assumption that the Scott-Vogelius discretization is well posed on the considered grid. Numerical studies support the analytic results and they show that the LSVS-grad-div method might lead to notable error reductions compared with the standard grad-div method.

References:

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¹WIAS Berlin
marwa@wias-berlin.de

²WIAS Berlin
john@wias-berlin.de

³WIAS Berlin
christian.merdon@wias-berlin.de