

## LOCAL PROJECTION STABILIZATION FOR INCOMPRESSIBLE FLOWS: EQUAL-ORDER VS. INF-SUP STABLE INTERPOLATION\*

G. LUBE<sup>†</sup>, G. RAPIN<sup>†</sup>, AND J. LÖWE<sup>†</sup>

**Abstract.** A standard approach to the non-stationary, incompressible Navier-Stokes model is to split the problem into linearized auxiliary problems of Oseen type. In this paper, a unified numerical analysis for finite element discretizations using the local projection stabilization method with either equal-order or inf-sup stable velocity-pressure pairs in the case of continuous pressure approximation is presented. Moreover, a careful comparison of both variants is given.

**Key words.** incompressible flows, Oseen model, stabilized FEM, local projection stabilization

**AMS subject classifications.** 65M60, 65N15, 76M10

---

\*Received November 29, 2007. Accepted for publication July 4, 2008. Published online on February 9, 2009. Recommended by A. Röscher.

<sup>†</sup>Department of Mathematics, NAM, University of Göttingen, Lotzestrasse 16-18, D-37083 Göttingen, Germany (lube, grapin, loewe@math.uni-goettingen.de).