

# On domain-robust preconditioners for the Stokes equations

Manfred Dobrowolski<sup>1</sup>

Many, if not all preconditioners for the Stokes equations depend on the LBB constant  $L(\Omega)$  which behaves like  $O(a^{-1})$  on domains  $\Omega$  with aspect ratio  $a$ . This fact leads to a poor convergence behavior of the preconditioned method on elongated domains such as channels which are typical for fluid flow problems. This drawback can be completely removed by using a second, very rough grid on which the small eigenvectors of the corresponding Schur complement eigenvalue problem can be efficiently represented.

In the second part we present a class of BPX-type preconditioners for the Stokes equations which are domain-robust and efficient but also completely parallel. Numerical results are given which demonstrate the effectivity of the presented methods.

---

<sup>1</sup>University of Wuerzburg, Institut fuer Mathematik, Am Hubland, 97074 Wuerzburg, Germany, dobro@mathematik-uni.wuerzburg.de