

On domain-robust preconditioners for the Stokes equations

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Many, if not all preconditioners for the Stokes equations depend on the LBB constant $L(\Omega)$ which behaves like $O(a^{-1})$ on domains Ω 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.

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