Schwarz Smoothers for Conforming Stabilized Discretizations of the Stokes Equations

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Abstract: The efficient solution of the Stokes equations is an important step in the development of fast flow solvers. Multigrid algorithms are the only kind of methods that provably scale linearly in cost with respect to the problem size. Hence, they are interesting candidates as preconditioners or solvers for the arising linear systems. A particulary important role play the smoothers applied on each level.

In [1] overlapping Schwarz smoothers in combination with a H^{div}-conforming discontinuous Galerkin approximation were proven to result in convergence rates that are not only independent of mesh size, but also reasonably small. A key assumption was that the discretization provided nested divergence free subspaces.

In this talk, we aim to answer the question whether this assumption can be relaxed to also allow using Schwarz smoothers in combination with conforming and possibly grad-div stabilized discretizations based on results in [2].

References

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