

A Nonoverlapping Domain Decomposition Preconditioner for a Symmetric Interior Penalty Method

Susanne C. Brenner, Eun-Hee Park, and Li-yeng Sung

Department of Mathematics and Center for Computation and Technology
Louisiana State University, Baton Rouge

Abstract

In this talk we will discuss a nonoverlapping domain decomposition preconditioner for the symmetric interior penalty Galerkin method [1, 2, 3]. The preconditioner is based on balancing domain decomposition by constraints [4]. Theoretical results on the condition number estimate of the preconditioned system will be presented along with numerical results.

References

- [1] J. Douglas, Jr. and T. Dupont. Interior penalty procedures for elliptic and parabolic Galerkin methods. *Lecture Notes in Phys. 58*, Springer-Verlag, Berlin, 1976.
- [2] M.F. Wheeler. An elliptic collocation-finite-element method with interior penalties. *SIAM J. Numer. Anal.*, 15:152–161, 1978.
- [3] D.N. Arnold. An interior penalty finite element method with discontinuous elements. *SIAM J. Numer. Anal.*, 19:742–760, 1982.
- [4] C.R. Dohrmann. A preconditioner for substructuring based on constrained energy minimization. *SIAM J. Sci. Comput.*, 25:246–258, 2003.