On the Influence of the Partitioning Schemes on the Efficiency of Overlapping Domain Decomposition Methods

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Abstract. One level overlapping Schwarz domain decomposition preconditioners can be viewed as a generalization of block Jacobi preconditioning. The effect of the number of blocks and the amount of overlapping between blocks on the convergence rate is well understood. This paper considers the related issue of the effect of the scheme used to partition the matrix into blocks on the convergence rate of the preconditioned iterative method. Numerical results for Laplace and linear elasticity problems in two and three dimensions are presented. The tentative conclusion is that using overlap tends to decrease the differences between the rates of convergence for different partitioning schemes.

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