

Overlapping Additive Schwarz preconditioners for degenerate problems

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In this paper, we consider some degenerated boundary value problems on the unit square. These problems are discretized by piecewise linear finite elements on a triangular mesh of isosceles right-angled triangles. The system of linear algebraic equations is solved by a preconditioned gradient method using a domain decomposition preconditioner with overlap. We prove that the condition number of the preconditioned system is bounded by a constant which independent of the discretization parameter. Moreover, the preconditioning operation requires $\mathcal{O}(N)$ operations, where N is the number of unknowns. Several numerical experiments show the performance of the proposed method.

This a joint work with S. Nepomnyaschikh (Novosibirsk).

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