
Yunrong Zhu
**Robust Domain Decomposition Preconditioner for Elliptic
Equations with Jump Coefficient.**

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This paper proves the robustness of the overlapping domain decomposition preconditioners for the finite element approximation of second order elliptic boundary value problems with strongly discontinuous coefficients. By analyzing the eigenvalue distribution of the preconditioned system, we prove that only a fixed number of eigenvalues may deteriorate with respect to the discontinuous jump or meshsize, and all the other eigenvalues are bounded below and above nearly uniformly with respect to the jump and meshsize. As a result, the asymptotic convergence rate of the preconditioned conjugate gradient methods is uniform with respect to the coefficients and meshsize.