Kening Wang* (kwang@math.sc.edu), Department of Mathematics, University of South Carolina, Columbia, SC 29208, and Susanne C. Brenner. Domain Decomposition Preconditioners for $C^0$ Interior Penalty Methods.

We study both the two-level additive Schwarz preconditioner and the Bramble-Pasciak-Schatz (BPS) preconditioner that can be used in the iterative solution of the discrete problems resulting from $C^0$ interior penalty methods for fourth order elliptic boundary value problems.

We show that the condition number of the preconditioned system for the two-level additive Schwarz preconditioner can be bounded by $C(1 + H/\delta)^3$, where $H$ is the typical diameter of a subdomain, $\delta$ measures the overlap among the subdomains and the positive constant $C$ is independent of the mesh sizes and the number of subdomains.

We also prove that the condition number of the BPS preconditioned system is of order $O((1 + \ln(H/h))^2)$, where $H$ and $h$ represent the coarse mesh size and the fine mesh size respectively. (Received September 27, 2005)