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TWO-LEVEL ADDITIVE SCHWARZ PRECONDITIONERS FOR FOURTH-ORDER MIXED METHODS*

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Abstract. A two-level additive Schwarz preconditioning scheme for solving Ciarlet-Raviart, Hermann-Miyoshi, and Hellan-Hermann-Johnson mixed method equations for the biharmonic Dirichlet problem is presented. Using suitably defined mesh-dependent forms, a unified approach, with ties to the work of Brenner for nonconforming methods, is provided. In particular, optimal preconditioning of a Schur complement formulation for these equations is proved on polygonal domains without slits, provided the overlap between subdomains is sufficiently large.

Key words. additive Schwarz preconditioner, mixed finite elements, biharmonic equation, domain decomposition, mesh dependent norms

AMS subject classifications. 65F10, 65N30, 65N55

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