

## A HIERARCHICAL PRECONDITIONER FOR THE MORTAR FINITE ELEMENT METHOD\*

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**Abstract.** Mortar elements form a family of nonconforming finite element methods that are more flexible than conforming finite elements and are known to be as accurate as their conforming counterparts. A fast iterative method is developed for linear, second order elliptic equations in the plane. Our algorithm is modeled on a hierarchical basis preconditioner previously analyzed and tested, for the conforming case, by Barry Smith and the second author. A complete analysis and results of numerical experiments are given for lower order mortar elements and geometrically conforming decompositions of the region into subregions.

**Key words.** domain decomposition, mortar finite element method, hierarchical preconditioner.

**AMS subject classifications.** 65F30, 65N22, 65N30, 65N55.

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