Lower Bounds for Overlapping and Nonoverlapping Domain Decomposition Preconditioners for Mortar Element Methods

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Abstract: We establish lower bounds for the condition numbers of two domain decomposition methods for elliptic problem discretized by geometrically nonconforming mortar finite elements:

- two-level overlapping additive Schwarz algorithms with unstructured coarse spaces; and
- iterative substructuring algorithms.

The lower bounds coincide, up to constants, with the upper bounds established elsewhere in the literature. The optimality of the condition number estimates is thus established.

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