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Nonconforming domain decomposition techniques for linear elasticity. (English)

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From the summary: We present a mortar finite element formulation based on dual basis functions and on a special multigrid method. The starting point for our multigrid method is a symmetric positive definite system on the unconstrained product space. In addition, we introduce a new algorithm for the numerical solution of a nonlinear contact problem between two linear elastic bodies. It is shown that our method can be interpreted as an inexact Dirichlet-Neumann algorithm for nonlinear problems. The boundary data transfer at the contact zone is essential for the algorithm. It is realized by a scaled mass matrix which results from a mortar discretization on non-matching triangulations with dual basis Lagrange multipliers. Numerical results illustrate the performance of our approach in two and three dimensions.

MSC:

- 74S05 Finite element methods applied to problems in solid mechanics
- 74B05 Classical linear elasticity
- 74M15 Contact in solid mechanics
- 65N55 Multigrid methods; domain decomposition for boundary value problems involving PDEs

Cited in **9** Documents

Keywords:

mortar finite element; Lagrange multiplier; multigrid method; contact problem