Parallel Domain Decomposition Methods for Elasticity Problems

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The discretization of the partial differential equations in elasticity with finite element methods often leads to very large systems of equations with several millions or even hundreds of millions of unknowns. Domain decomposition methods have been proven to be very efficient and robust iterative solvers which also have a good parallel scalability.

In this talk, a special family of nonoverlapping domain decomposition methods is considered, the dual-primal FETI (FETI-DP) methods. Here, a nonoverlapping decomposition into subdomains is used. The term dual-primal refers to the idea of enforcing some continuity constraints across the interface between the subregions throughout the iteration as in primal methods, while other constraints are enforced by using dual variables, i.e., Lagrange multipliers. Numerical results will be presented for model problems and industrial applications, illustrating the good parallel scalability properties of this method.

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