

# Domain decomposition approach to large-scale structural systems

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## Abstract

Finite element based formulations for flexible structural systems are becoming increasingly popular and as the complexity of the configurations to be treated increases, so does the computational cost. It seems natural to investigate the applicability of parallel processing to this type of problems; domain decomposition techniques have been used extensively for this purpose. In this approach, the computational domain is divided into non-overlapping sub-domains, and the continuity of the displacement field across subdomain boundaries is enforced via the Lagrange multiplier technique. In the finite element literature, this approach is presented as a mathematical algorithm that enables parallel processing. In particular, it is shown that a combination of the localized Lagrange multiplier technique with the augmented Lagrange formulation leads to interesting solution strategies. The present algorithm is relatively simple and leads to improved convergence and efficiency characteristics. Finally, implementation on a parallel computer was conducted for the proposed approach. The numerical results for two- and three-dimensional problems were compared with those obtained by the dual-primal FETI approach.

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