Finite Element Procedure Using Domain Decomposition Method Based on the Nitsche's Method

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Domain Decomposition Method (DDM) is often used to solve large-scale problems by splitting them into smaller scale ones on subdomains. It is one of the most significant ways for devising parallel algorithms that can benefit strongly from multiprocessor computers. In previous methods such as Balancing Domain Decomposition (BDD) , the continuity of the solution across subdomain interface is enforced by representing the value of the solution on all neighboring subdomains by the same unknown. In dual methods, such as Finite Element Tearing and Interconnecting (FETI), the continuity of the solution across the subdomain interface is enforced by Lagrange multipliers.
The Nitsche's method for the Lagrange multiplier method can stabilize solutions of their problems. In this paper, we propose a Lagrange-type DDM based on the Nitsche's method.

Keywords: FEM, Domain Decomposition Method, Nitsche's Method, Lagrange Multiplier