

A TFETI Domain Decomposition Solver for von Mises Elastoplasticity Model with Combination of Linear Isotropic-Kinematic Hardening

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Abstract : In this paper we present the efficient parallel implementation of elastoplastic problems based on the TFETI (Total Finite Element Tearing and Interconnecting) domain decomposition method. This approach allow us to use parallel solution and compute this nonlinear problem on the supercomputers and decrease the solution time and compute problems with millions of DOFs. In our approach we consider an associated elastoplastic model with the von Mises plastic criterion and the combination of linear isotropic-kinematic hardening law. This model is discretized by the implicit Euler method in time and by the finite element method in space. We consider the system of nonlinear equations with a strongly semismooth and strongly monotone operator. The semismooth Newton method is applied to solve this nonlinear system. Corresponding linearized problems arising in the Newton iterations are solved in parallel by the above mentioned TFETI. The implementation of this problem is realized in our in-house MatSol packages developed in MATLAB.

Keywords : isotropic-kinematic hardening, TFETI, domain decomposition, parallel solution

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