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ANALYSIS OF CRACKED MODEL UNDER FINITE-STRAIN ELASTOPLASTICITY USING PARTITIONED COUPLING METHOD

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When cracked structures are subjected to excessive loading such as a strong earthquake, the crack tip vicinity easily becomes a state of large-strain plasticity. However a most portion far from the crack can stay as a small-strain elastic body or a weakly nonlinear body. For such problems, we have studied a partitioned coupling method [1], which was originally proposed for fluid–structure interaction coupling [2]. In the method, a whole analysis model is decomposed into two non-overlapped domains, i.e. a local domain and a global one. The two domains are analyzed alternately with assumed boundary conditions on the interface. The assumed boundary conditions are updated by an iterative solution technique, and a converged solution is finally obtained.

Using the method, a structure with a crack was analyzed under finite-strain elastoplasticity. The numerical result was compared to that of conventional finite element analysis.

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