

Elastoplastic fracture mechanics analysis using X-FEM and wavelet Galerkin method

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Elastoplastic fracture mechanics analysis is carried out using eXtended Finite Element Method (X-FEM) and wavelet Galerkin method (WGM). In the fracture mechanics analyses using the WGM, severe stress concentration near crack tip can be represented by superposing different length scale wavelet functions. Spatial resolution can be easily controlled based on the multiresolution properties in the WGM. However, it is difficult to represent displacement discontinuity of cracks in the WGM. Enrichment functions are introduced to represent the crack shape based on the X-FEM. The author's previous study, linear fracture mechanics analyses have been carried out using the X-FEM and the WGM. In this study, the method extended to the elastoplastic fracture mechanics analysis. The numerical examples are demonstrated to validate the proposed approach.

Keywords: X-FEM, wavelet Galerkin method, elastoplasticity, fracture mechanics