

Boundary element analysis of inclusions with corners

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Abstract

Boundary element method (BEM) has proven to have very good resolution of large stress gradients such as those that may arise at material interface and reentrant corners. There is, however, a paucity of literature in usage of BEM when the inclusion has a corner. The stress singularity at the corner creates numerical difficulties that need to be addressed. This paper describes: application of BEM to inclusion with and without corners; the numerical modeling difficulties; a methodology for calculation of eigenvalues and stress intensity factors without elaborate analytical expressions; and the future research that is needed for the growth of the boundary element methodology for application to inclusion problems. Numerical results for a rectangular inclusion with sharp and fillet corners that in the limit becomes a circular inclusion demonstrate the potential of the proposed methodology in the analysis of inclusion problems.