

Abstract for:

**A node-centric indirect boundary element method:
three-dimensional displacement discontinuities**

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S. Vijayakumar, T.E. Yacoub, J.H. Curran*

Summary:

An indirect boundary element formulation based on unknown physical values, defined only at the nodes (vertices) of a boundary discretization of a linear elastic continuum, is introduced. As an adaptation of this general framework, a linear displacement discontinuity density distribution using a flat triangular boundary discretization is considered. A unified element integration methodology based on the continuation principle is introduced to handle regular as well as near-singular and singular integrals. The boundary functions that form the basis of the integration methodology are derived and tabulated in the appendix for linear displacement discontinuity densities. The integration of the boundary functions is performed numerically using an adaptive algorithm which ensures a specified numerical accuracy. The applications include verification examples which have closed-form analytical solutions as well as practical problems arising in rock engineering. The node-centric displacement discontinuity method is shown to be numerically efficient and robust for such problems.

* Corresponding author. Tel.: +416-978-4027; fax: +416-698-0908

email: john.curran@utoronto.ca