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An incremental procedure for three-dimensional contact problems with friction

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Abstract

An incremental procedure to deal with the three-dimensional contact problem using the boundary element method is presented. The Coulomb friction law is used without discretizing it, which produces an additional nonlinearity due to the fact that the sliding directions are not known. A Newton-Raphson scheme is used in each increment to determine the correct sliding direction. The load increments are associated with the linear behaviour of the solids involved in the contact whose boundaries have been replaced by triangles with constant evolution of displacements and stresses on them. The developed procedure covers the three classical contact situations: advancing, receding and conforming contact, an example belonging to each of them being analysed in this paper.



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