SM2L_12646

XXI International Congress of Theoretical and Applied Mechanics
Warsaw, Poland, August 15–21, 2004

Second-Order Cone Complementarity Formulation for Quasi-Static Incremental Frictional Contact Problem in Three-Dimensional Space

Y. Kanno[(1)], **A. Pinto da Costa**[(2)], J.A.C. Martins[(2)]

(1) *Kyoto University, Kyoto, Japan*
(2) *Instituto Superior Tecnico, Lisboa, Portugal*

The numerical solution of quasi-static incremental frictional contact problems involving discrete versions of two- and three-dimensional elastic solids or structures is sought with a formulation as a Second Order Cone Linear Complementarity Problem (SOCLCP). In this formulation the three-dimensional Coulomb friction cone is considered without any pyramidal approximation, and the friction conditions are written as linear complementarity conditions over two second-order cones. The SOCLCP's are solved by a method developed by Hayashi, Yamashita and Fukushima (2003) that combines smoothing and regularization procedures, and is based on the Euclidean Jordan algebra on second-order cones. Two illustrative numerical examples are presented, which involve the frictional contact with flat obstacles of a three-dimensional double layer truss and a two-dimensional finite element model of a block in plane strain.

View the extended summary