Solving Hertz contact problem using polynomial matrices

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ABSTRACT

In this paper, the indentation of an elastic half-space has been completely characterized by an axisymmetric punch under a monotonically applied normal force and under the assumption of Coulomb friction law in the region of contact. The proposed algorithm has been used to facilitate the Hertz contact problem [1] as a coupled system of integral equations. The appropriate identification of the variable of a polynomial matrix has shown that the Abel integral equations of the problem can be transformed to a polynomial matrix equation. In addition, the factorization of its polynomial matrix has enabled us to characterize a single integral equation which recovers the normal stress as well as the compliance factor. The presented model showed a reliable behavior and an acceptable accuracy for the mentioned method in comparison to the previously conducted researches like [2].

References

[1] **D.A. Spence**, The Hertz contact problem with finite friction. J. Elasticity 5, 297−319, 1975.

[2] **A. Gauthier, P.A. Knight, S. McKee**, The Hertz contact problem, coupled Volterra integral equations and a linear complementarity problem. J. Comput. Appl. Math. 206, 322−340, 2007.