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On DMT methods to calculate adhesion in rough contacts

G. Violano, L. Afferrante[1,*]

[1]*Department of Mechanics, Mathematics and Management, Politecnico of Bari, V.le Japigia, 182, 70126, Bari, Italy*

Abstract

In this paper, we compare different rough contact-mechanics theories with the assumption of weak interfacial adhesion. Two different approaches for the local modeling of adhesion are also considered: the DMT force approach (DMT-F) and the Maugis' approximation (DMT-M). The first approach is based on the idea of summing up attractive interactions that act outside the contact zone; the latter considers a constant adhesive load for each asperity in contact.

A comparison with numerical data proves the DMT-F approach is very accurate when hard solids and low adhesive interactions are considered. The DMT-M approach shows, instead, less accuracy especially at low fractal dimensions.

Keywords: Adhesion; rough contact mechanics; pull-off force; DMT theory

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*Corresponding author. Email:luciano.afferrante@poliba.it,phonenumber:+390805962704

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