

Accepted Manuscript

Exact and approximate solutions of the infinite integrals of the asperity height distribution for the Greenwood-Williamson and the Greenwood-Tripp asperity contact models

Radosław Jedynek



PII: S0301-679X(18)30449-3

DOI: [10.1016/j.triboint.2018.09.009](https://doi.org/10.1016/j.triboint.2018.09.009)

Reference: JTRI 5397

To appear in: *Tribology International*

Received Date: 4 June 2018

Revised Date: 4 September 2018

Accepted Date: 10 September 2018

Please cite this article as: Jedynek Radosław, Exact and approximate solutions of the infinite integrals of the asperity height distribution for the Greenwood-Williamson and the Greenwood-Tripp asperity contact models, *Tribology International* (2018), doi: <https://doi.org/10.1016/j.triboint.2018.09.009>.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Exact and approximate solutions of the infinite integrals of the asperity height distribution for the Greenwood-Williamson and the Greenwood-Tripp asperity contact models

Radosław Jedynak ¹

Abstract

The main contribution of this paper is in providing the closed-form solutions for F_2 and $F_{5/2}$ integrals. They appear in problems of contact mechanics described by the Greenwood-Tripp model for the contact of two nominally flat rough surfaces. It is evident that exact solutions as proposed are better than the existing approximate solutions because they could significantly improve the results in comparison to the solutions which are obtained via existing approximants. Relatively simple approximation formulas for those who do not choose to use closed-forms are also proposed. Two kinds of rational approximants which differ in complexity and accuracy are provided. The maximum relative error of more accurate approximations is about $10^{-8}\%$, while for the simpler approximants is about $10^{-4}\%$.

Keywords: Greenwood–Williamson theory, Greenwood–Tripp theory, Contact mechanics, Roughness, Real contact area, Statistical model

¹Kazimierz Pulaski University of Technology and Humanities, ul. Malczewskiego 20a, 26-600 Radom, Poland; jedynakr@pr.radom.pl

Download English Version:

<https://daneshyari.com/en/article/11023777>

Download Persian Version:

<https://daneshyari.com/article/11023777>

[Daneshyari.com](https://daneshyari.com)