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Frictional contact analysis of spatial prismatic joints in multibody systems. (English)

Zbl 1247.70025

Multibody Syst. Dyn. 26, No. 4, 441-468 (2011).

An approach for the frictional contact analysis of rigid multibody systems with spatial prismatic joints is presented. Such a joint consists of a slider and a guide (both are being rigid), and slider can be enclosed into the guide entirely or partially. The length of overlap has constant value in the first case and varies in the second one. It is assumed that the cross-section of contact surface is rectangular. On this way it is shown that surface-to-surface (line-to-line) contacts in joint are equivalent to point-to-point contacts, and then a set of equations is given which enables to determine the location and force of contacts if the joint reaction forces are given. A group of gap functions associated with the corner points of the overlap of the slider is introduced, and relations between them are highly emphasized. As the non-colliding contacts being predominant when clearances of joints are small, the contact forces are formulated in terms of resultant frictional forces in the joint. Three numerical examples are given to illustrate the method proposed.

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MSC:

70E55 Dynamics of multibody systems

70F40 Problems involving a system of particles with friction

Keywords:

contact analysis; spatial prismatic joints; multibody systems; friction; joints with clearances; gap functions

Software:

MDC-ELLIPSOIDs

Full Text: DOI

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