

Implementation of the Omni Vehicle Dynamics on Modelica

Ivan Kosenko¹ Kirill Gerasimov²

¹Moscow State Technical University of Radio Engineering, Electronics, and Automation
Department of Engineering Mechanics
Vernadsky Avenue 78, 119454, Moscow, Russia
kosenko@ccas.ru

²Lomonosov Moscow State University
Department of Theoretical Mechanics and Mechatronics
Leninskiye Gory 1, Main Building, GSP-1, 119991, Moscow, Russia
kiriger@gmail.com

Investigation of omni vehicle dynamical properties is sufficiently popular topic in frame of the multibody dynamics [1, 2, 3, 4]. Omni wheel is defined as one having rollers along its rim. Respectively omni vehicle is one equipped by omni wheels. Several steps of development of dynamical model for the omni vehicle multibody system are implemented.

The contact tracking using simplified and efficient algorithm turns out being possible for the roller. On the next stage the omni wheel model is developed and debugged. After that the whole vehicle model is assembled as a container class having arrays of objects as instantiated classes / models of omni wheels and joints. Dynamical properties of the resulting model are illustrated via numerical experiments.

Here we rely upon the “simple”3D multibody dynamics library classes utilized previously in several examples of the multibody systems dynamics [5]. Simultaneously this library enables us to create complex dynamical models including unilateral constraints of different nature.

Unlike to [2, 3] we emphasize here on the details of the unilateral constraint implementation paying special attention to contact switching when rollers changing.

References

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