

Science and Engineering Research Program Project Description



Leibniz
Universität
Hannover

Institute: Institute of Dynamics and Vibration Research

Project title: Extension of the brush model to the entire tire contact patch

Project description: The Institute of Dynamics and Vibration Research is dealing with the description and modeling of a wide variety of elastomer components and their counterparts. One research focus is the description of the tire-road contact. The brush model is a very well known model for the description of a rolling deformable wheel. The tread of the tire is replaced by brush hairs. These allow the description of the establishing adhesion and sliding zone within the tire contact patch. In the classic brush model, the tread is summarized as a one-dimensional line. However, in order to be able to represent temperature distributions in the entire tire or wear patterns with the brush model, the force distributions in the entire tire contact patch are required. Within the scope of this project, the brush model is therefore to be extended to the three-dimensional case. Thereby it has to be clarified how the contact pressure distribution in normal direction changes for different driving conditions (pure longitudinal, pure lateral or combined conditions) and which effect on the result of the contact forces can be expected. Furthermore, it has to be investigated how the brush hairs have to interact for a realistic representation of the contact forces. Experimental investigations to parameterize the model and validate the overall tire model will be identified as part of this project. The implementation of the modeling is done with the software MATLAB.

Required skills: Engineering mechanics, MATLAB

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