

K. Frischmuth, M. Arnold, M. Hänler, H. Netter

Differentialgleichungen und singuläre Mannigfaltigkeiten in der dynamischen Simulation von Rad-Schiene-Systemen. - In: Hoffmann, K.-H.; Jäger, W.; Lohmann, Th.; Schunck, H. eds.: Mathematik – Schlüsseltechnologie für die Zukunft. - Springer-Verlag, Berlin Heidelberg New York, 1997, S. 331–342.

Abstract. Within the development of modern advanced railway vehicles the simulation tools require the efficient dynamical simulation of wheel-rail systems. In the present paper we concentrate on the formulation and numerical solution of geometrical conditions for wheel-rail contact in the framework of a multibody system (MBS) model. We analyse the classical rigid contact model that results in non-smooth constraints and in singularities in the solution of the MBS model equations. Motivated by the elastic deformation of wheel and rail a *quasi-elastic contact model* is developed as alternative. It regularizes the model equations and yields a smooth solution both without singularities and without high-frequency oscillations. We discuss implementations of this approach that are adapted to special needs in various applications. Finally, a short overview about the wheel-rail module of the MBS package SIMPACK is given. A case study illustrates an industrial application of the regularized contact model.

Contact: kurt.frischmuth@mathematik.uni-rostock.de,
martin.arnold@mathematik.uni-halle.de