

Numerical Aspects in Contact Mechanics and Rolling Bearing Simulation

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6 June 1996

Abstract

The task to model and simulate rolling bearings has proved to be difficult in many respects. To get a clearer insight into the dynamical behaviour of a rolling bearing, it is necessary to study simpler models that reflects not all, but some interesting features of a rolling bearing. In this thesis we do a preliminary study of simplified rolling bearing models, and draw some conclusions about the modelling, basically from a numerical point of view.

Key words: Rolling bearings, contact mechanics, multibody mechanics, force models, impacts, stiffness, highly oscillatory problem, ODE, DAE, singular perturbation problem, stability, reproducibility, BDF, implicit Adams methods, implicit Runge-Kutta methods, scaling.

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