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# The Running Behaviour of an Elastic Wheelset

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The wheelset is the central element of a railway vehicle, responsible for support and guidance. For simulations of the low-frequent behaviour, the wheelsets are usually considered as rigid bodies. However, the wheel-rail contact is a strong nonlinear element which can be very sensitive even to small relative motions of wheel and rail. Therefore, the wheelsets and the rails are modelled as elastic bodies by using a modal synthesis. The required shape functions are obtained by Finite Element calculations. To investigate the influence of the structural flexibility, the simulation is performed with and without taking into account the elasticity of the wheelsets and the rails. The comparison of the results shows, that the so called critical speed drastically drops to lower travelling speeds, if the structural flexibility is taken into account. Beyond this critical speed, a dangerous limit cycle occurs. Furthermore, the structural flexibility leads to larger amplitudes of the motions.

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