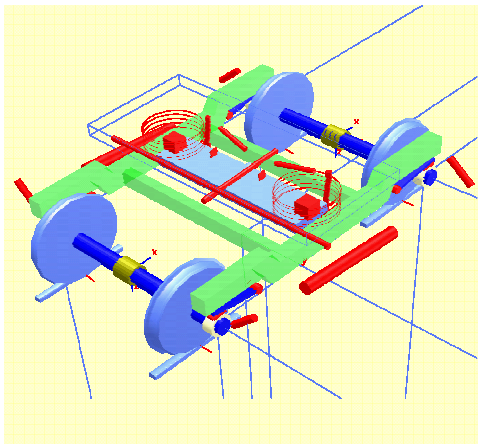
KTH Engineering Sciences

Rail Vehicle Dynamics (SD2313/SD231V)

year 4, period 3, 8 hp, Jan-March



Multibody simulation model of bogie

Rail Vehicle Dynamics – has become increasingly important due to the wish to operate faster passenger and heavier freight trains to increase competitiveness. Further the demands on passenger comfort and track friendliness, i.e. low forces between wheel and rail, increase to ensure low maintenance costs of the system.

Aim

The overall aim of the course is to become prepared to work as vehicle dynamics engineer in industry or for railway operators/authorities. You shall be familiar to the different problems involved in dynamic vehicle-track interaction and be capable of actively choosing system properties that result in good vehicle performance and limited damage to vehicle and track components. More specifically this means that after a fulfilled course you should be able to

- list the vehicle and track components that influence the dynamic system behaviour and also to describe how,
- use derived equations to calculate permissible speed or nominal track geometry needed,
- explain mathematically why and when vehicle ride instability can occur,
- derive the equations for wheel-rail forces for vehicles at quasistatic curving,
- discuss the trade-off between stability and curving performance, and its practical implications,
- explain how wheel and rail profiles, and equivalent conicity, affect the trade-off above,
- describe how wheel and rail wear can be predicted and how it can be reduced,
- describe how ride comfort in rail vehicles is evaluated and reflect on how it can be improved.

MATLAB and multibody dynamics software are used to practice most of the aspects in the course.
Course language is English.

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