

# VORTECH

## MSc project: Using CONTACT in dynamical simulations

The CONTACT software is designed to analyze frictional contact problems in great detail. As an example, train wheels exert a large force upon the rails, which causes both objects to deform slightly. Rail industry companies can use this software to determine this deformation as well as the contact forces.

The goal of this master thesis project is to find a way to use CONTACT for time dependent contact problems. For example, at the collision of an elastic ball on a solid wall, how will the ball deform? CONTACT is generally used for static problems, so one needs to figure out a way to match the contact forces computed by CONTACT with a carefully selected time integration scheme in order to compute this deformation.

The first part of this project is the literature study. Time integration methods for mechanical problems, contact models and elasticity, as well as flexible multiple body systems need to be researched.

The second part involves applying the theory for a simple test problem, such as the collision of the ball as described before. Later on, adjustments to the problem can be made or more complex problems can be researched, for example by allowing friction to the model. The goal is to solve these problems both by using CONTACT and by using a Finite Element Method. Multiple time integration methods should be reviewed and tested and the result should be compared with the Finite Element approach of the contact problem.

