

## Introduction

From a safety point of view, the minimization of the braking distance (i.e., maximizing the deceleration potential) is obviously one of the most important topics in vehicle development. With today's brake systems, the maximum deceleration of a vehicle is limited by the contact between the tire and the road. At the same time, there are conflicting development targets for tires, e.g., durability and low rolling resistance. This applies especially for truck tires, which are optimized for fuel efficiency and high mileage.

To simulate the behavior of tires in computer models, different mathematical models have been proposed, e.g., the models based on the "Magic Formula" by Pacejka. The development of tire models, however, often focuses on passenger cars and motorcycles, and the resulting parameterizations cannot necessarily be extrapolated to the high normal forces acting on truck tires.

## Objective

The aim of this project is to compare different simulation models for tires and evaluate their applicability to truck tire modelling. To this end, an existing virtual tire test bench shall be used and the simulation of different maneuvers, such as, e.g., full braking, shall be considered. To evaluate the behavior of the tire models, a thorough understanding of vehicle dynamics and the tire behavior shall be developed by the student. Based on our existing tire model database, the physical range of the parameters of the different models and their influence on the tire behavior shall be elaborated.

## Requirements

- Interest in modelling and simulation
- Some programming skills
- Structured way of working
- First experience with multi-body dynamics
- Experience in Simpack is a plus

## Our offer

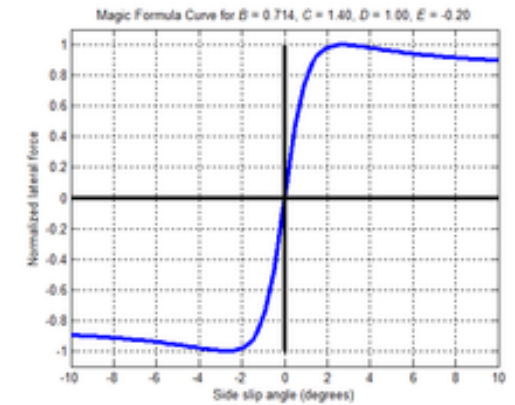
- Join a team of brake simulation experts
- Enjoy close supervision and training
- Room for personal initiative and creative freedom

## Details

- Job type: Bachelor thesis or student research project
- Start: As soon as possible

## Contact

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$$y = D \cdot \sin\{C \cdot \arctan[Bx - E \cdot (Bx - \arctan(Bx))]\}$$

