



## Main Focus

---

- Digital Environmental Data
- Load Data and Durability
- Dynamics and System Simulation
- Human Models and Human-Machine Interaction
- Cables, Hoses and Flexible Structures
- Tire Models – CDTire
- Technical Center: Human Machine Interaction and Driving Simulators



# Mathematics for Vehicle Engineering

## What does your division deal with and what constitutes its research work?

The division is divided into two departments as well as the project group "Tire Simulation" and the cross-sectional unit "MF-Technikum", which takes care of the test and measurement technology.

In the department "Dynamics, Loads and Environmental Data", we develop methods and tools for system simulation, incorporating environmental data and usage variability. In this way, we address the main aspects in vehicle engineering: operational stability, reliability, energy efficiency and ADAS/AD.

The department "Mathematics for the digital factory" bundles the activities for the design of software tools for the virtual development of products; this includes, for example, IPS Cable Simulation: With this software family, the assembly of cables, cable harnesses and hoses can be designed virtually and validated in operation.

## What potential does your division's research have for a better future?

Vehicle development is currently facing a number of challenges. In addition to the need to make product development and production more efficient, there is also the trend toward ever to ever more advanced assistance (ADAS) through to autonomous driving, as well as the development and qualification of alternative drive systems that are as emission-free as possible. The research focus of our division is geared to these three challenges.

## Where do you see your division in five years?

Although the vehicle industry as a whole is going through a crisis, we believe we are well positioned with the focus described above. We expect the area to be in a good position both scientifically and economically in five years' time with three departments and the technical center.

## Which three keywords best describe your department?

- Innovative – interdisciplinary – professional

### Department topics in this report:

- The Pilot Plant: Link Between Reality and Simulation . . . . . S. 20
- Planning – Controlling – Regulating Traffic Flows . . . . . S. 22
- What New Drive Concepts Do We Need? . . . . . S. 23
- "CDtire": Realistic Simulation of Tires . . . . . S. 26

### Contact

Dr. Klaus Dreßler  
Division Director "Mathematics for  
Vehicle Engineering" and Head of  
Department "Dynamics, Loads and  
Environmental Data"  
Phone +49 631 31600-4466  
klaus.dressler@itwm.fraunhofer.de

