Courses in English
Course Description

Department 03 Mechanical, Automotive and Aeronautical Engineering

Course title Impact Simulation of Vehicle Structures

Hours per week (SWS) 4

Number of ECTS credits 6

Course objective
• Profound understanding of nonlinearities in solid mechanics.
• Profound understanding of solution methods for non-linear problems.
• Profound understanding of methods for time integration for dynamic problems.
• Ability to choose an appropriate numerical method for the solution of a problem setting in the field of nonlinear dynamics.
• Ability to perform basic impact simulations with a commercial code (lab).
• Ability to validate results of numerical impact simulations and to assess towards plausibility.
• Ability to integrate impact/crash simulations into the development process in a constructive manner.

Prerequisites

Recommended reading
• Script for download for enrolled students.

Teaching methods Lecture, exercise, lab

Assessment methods Project Thesis

Language of instruction English

Name of lecturer Prof. Dr.-Ing. Markus Gitterle

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Link

Course content
• Nonlinearities in solid mechanics (general, geometrical nonlinearities, nonlinear materials, contact and friction).
• Methods for numerical treatment of nonlinearities, focal point on contact nonlinearities.
• Methods for discretization in time, implicit and explicit methods, requirements for numerical simulation of highly dynamic problems (impact, crash).
• Application of methods learnt with a commercial code (LS-DYNA), examples with main focus on crash analysis, validation on basis of analytical methods.

Remarks