Fast dynamics and crash

ECTS credits
1 credits

Semester
Fall

In brief

Course langage: French

Presentation

Learning objectives

- Discover the specific issues related to the modeling of materials and structures in fast and crash dynamics:
  -- explicit integration schemes in time
  -- geometric nonlinearities (large rotations, large displacements)
  -- nonlinear behavior of materials
  -- contact-friction
  -- specific finite elements
- Use and parameterization of an explicit calculation code (Radioss)

Description of the programme

- Introduction to the analysis of mechanical systems in dynamics
- Presentation of the HyperWorks software suite
- Theoretical aspects:
  -- Time discretization (implicit/explicit, stability condition of the schemes)
  -- Discretization in space (finite elements and hourglass control)
- Modeling choices:
  -- Behavioral relationships of different materials
  -- Contact modeling
  -- Addition of kinematic constraints and loads
- Practical application using a fast dynamics calculation code (HyperWorks/Radioss)
  -- Setting the data of the problem
  -- Choice and parameterization of algorithms

-- Critical analysis of the calculation results

Generic central skills and knowledge targeted in the discipline

- Know the theoretical specificities of fast dynamics
- Know how to choose to build a model adapted to the treated problem
- Know how to choose the algorithm adapted to the treated problem
- Know how to analyze and criticize a calculation result

How knowledge is tested

CC : Report on a mini-project (100%)

Bibliography

Course material

Teaching team

- Mathis Loverini (engineer, Altair, Lyon)
- Bilal Bendjeffal (engineer, Altair, Paris)

Total des heures		**24h**
CM	Master class	8h
TD	Directed work	8h
TP	Practical work	8h

Useful info

Name responsible for EU

Lead Instructor

Stéphane Bourgeois

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