

Material behavior - Large strain



ECTS credits
2 credits



Semester
Spring

In brief

> **Course language:** French

Presentation

Prerequisites

Continuum mechanics, algebra and tensor analysis (1st year [Mechanics](#) course)

Learning objectives

Know how to deal with problems in large strain framework:

- Master the concepts of configuration and measurement of stress and strain seen during the first year adapted to the framework of large strain
- Know how to formulate laws of behavior in large strain
- Know how to implement these notions within the framework of a calculation software

Description of the programme

- Definition of kinematics and sthenics in large deformations
- Equilibrium equations
- Rewriting of the thermodynamic framework in the different configurations
- Non-linear elasticity
- Hyperelastic models, special cases of isotropy and incompressibility
- Some examples of dissipative models, notions of intermediate states and application to elastomers

Generic central skills and knowledge targeted in the discipline

- Know how to identify the appropriate behavioral model for the problem at hand
- Model complex problems with advanced behavioral models
- Conduct and analyze calculations in large deformations

How knowledge is tested

DS: written evaluation, 2h (100%)

Bibliography

- Course handout (PDF)
- J. Garrigues, Cinématique des milieux continus ([online](#))
- G. Holzapffel, Nonlinear solid mechanics, 2000
- C. Felippa, Nonlinear Finite Elements (online)

Teaching team

Stéphane Lejeunes (CNRS Research Engineer, Laboratory of Mechanics and Acoustics)

Total des heures		24h
CM	Master class	12h
TD	Directed work	8h
TP	Practical work	4h

Useful info

Name responsible for EU

Lead Instructor

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