

# Material behavior - Large strain



#### In brief

> Course langage: 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



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- · 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 (C 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
СМ	Master class	12h
TD	Directed work	8h
TP	Practical work	4h

# Useful info

## Name responsible for EU

#### Lead Instructor

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