

Solid mechanics

Introducing

Description

Theory of stresses, theory of strains, displacement-strain relationship, linear elasticity constitutive law, formulation of the elasticity problem, analytical methods for solving the general problem of linear elasticity. Applications in practical exercises using Python programming language.

Objectives

At the end of this module, the student should have a comprehensive understanding of solid deformation mechanics, stresses, linearized strains, displacement fields and the constitutive relationship in elasticity.

The student should be able to:

- Analyze the state of stress and strain of a solid under loading.
- Calculate the stress state based on the strain state and vice versa.
- Calculate the strain state based on the displacement field.
- Establish equations for the local equilibrium of the solid at every point.
- Propose a relevant modeling of a real problem, particularly in terms of boundary conditions.
- Calculate the stresses from the diagrams of internal solicitations obtained from beam theory.

Necessary prerequisites

Mathematics (analysis, linear algebra, numerical analysis), general mechanics (statics and kinematics), beam theory (internal solicitations, stresses in beams...), basics in Python programming.

Évaluation

L'évaluation des acquis d'apprentissage est réalisée en continu tout le long du semestre. En fonction des enseignements, elle peut prendre différentes formes : examen écrit, oral, compte-rendu, rapport écrit, évaluation par les pairs...

Practical info

Location(s)

 Toulouse