UE Numerical methods for nonlinear mechanics

ECTS
6 crédits

Composante
UFR PhITEM (physique, ingénierie, terre, environnement, mécanique)

Période de l'année
Automne (sept. à dec./janv.)

- **Langue(s) d'enseignement:** Anglais
- **Ouvert aux étudiants en échange:** Oui
- **Code d'export Apogée:** PAX9CEAB

Présentation

Description

- From physics to numerical models: continuum mechanics problems, variational formulations, Rayleigh Ritz methods, Finite element one dimensional example
- Introduction to solid mechanics problems : elastostatics virtual work theorem : finite element discretization, the example of simple finite elements (constant strain triangle), Comments about Stiffness matrices
- Variational formulation of an initial boundary value problem: change of configuration, introduction to different stress and deformation tensors, the so called small strain approximation
- Time discretization and incremental problem: Newton method, residual computations, auxiliary linear system computations, boundary condition issues
- Space discretization : finite element method, projection on to a finite dimensional space, isoparametric finite element numerical integration Gauss method
- Constitutive equations integrations : consistent tangent stiffness matrix: numerical approach, Hardening plasticity, integration algorithms, consistent tangent stiffness matrix : analytical approach, Locking ant related topics
- Miscellaneous : coupling problems, the rate problem and uniqueness issues

Heures d'enseignement

UE Numerical methods for nonlinear mechanics - CM	CM	30h
UE Numerical methods for nonlinear mechanics - TD	TD	10h

Période : Semestre 9

Infos pratiques

Lieu(x) ville

- Grenoble

Campus

- Grenoble - Domaine universitaire