

# Simulation of Internal Combustion Engines

- I. Static analysis
  - a. Definition of Finite Element Method
  - b. Pre-Processing
    - i. Understanding the case
    - ii. Boundary conditions (why we need, types)
    - iii. Material model (most important factors, linear/non-linear model)
  - c. Processing
    - i. Meshing (types, quality)
    - ii. Convergence (definition)
  - d. Post-Processing
    - i. Verification (definition)
    - ii. Validation (definition, example)
- II. Thermal analysis
  - a. Definition of Finite Element Method
  - b. Pre-Processing
    - i. Understanding the case
      - 1. Conduction, Convection, Radiation (definitions, examples)
    - ii. Computational Domain
      - 1. Open-Space domain
      - 2. Closed-Space domain
      - 3. Boundary conditions (why we need, types)
  - c. Processing
    - i. Meshing (types, quality)
    - ii. Simulation type (steady/unsteady)
    - iii. Convergence (definition)
  - d. Post-Processing
    - i. Verification (definition)
    - ii. Validation (definition, example)