Verification & Validation

• Verification: Am I computing things right?
  • Does my program have bugs?
  • Does my numerical simulation correspond to my mathematical/conceptual model?
  • Is the quality of my approximations and discretization sufficient? → Today

• Validation: Am I computing the right thing?
  • Is my model a sufficiently good representation of reality? → Lab Report
  • Is the underlying mathematical model/my theory good enough?
Discretization in FEA

Resolution vs.

Element shape vs.

Interpolation ansatz (= FE basis functions) vs.
Convergence Analysis

Scaling factor: 500

Scaling factor: 10
Convergence Analysis

[Graph showing deflection (mm) vs. DOF (Degrees of Freedom). The deflection increases significantly with DOF, reaching a plateau at around 11.0 mm for DOF values of 500 and above. The line is labeled as 'Hexahedron, quadratic'.]