Ansys Mechanical Beyond the Basics

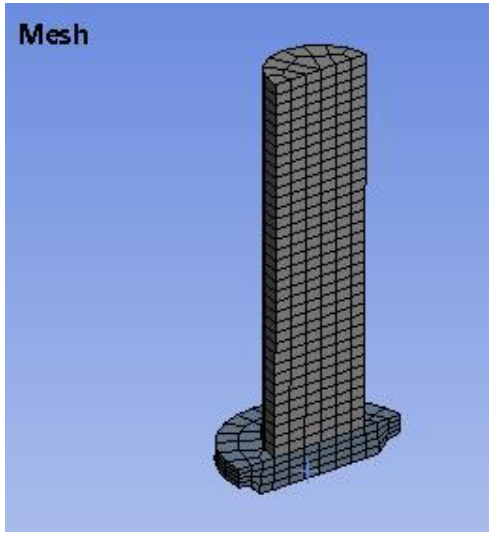
Module 04 Student Reference Guide: Enhanced Mesh Techniques

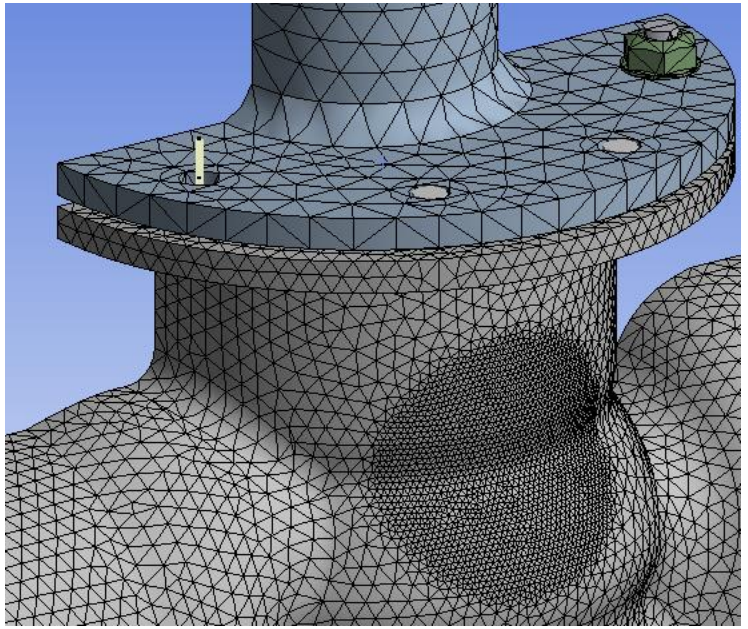
Release 2021 R2

Module 04: Learning Objectives

We'll conclude this module with a general understanding of the following:

- Review of existing mesh controls on the model
- How Shared Topology influences the mesh on affected bodies
- Meshing techniques to improve the efficiency of the solution
- Understanding mesh quality and statistics and their impact on solver performance





Module 04: Agenda

Topics covered in the instructor demonstration:

- Review Body Sizing from Module 06
- Shared Topology on Valve Rod / Valve Seal
  - Hexahedron-to-tetrahedron transition at interface
  - Mesh Metrics for element quality
- Error Limits
- Display Style: Element Quality
- Multizone mesh method
- Sweep size
- Mesh refinement
- Sphere of Influence
- Mesh statistics for solver performance

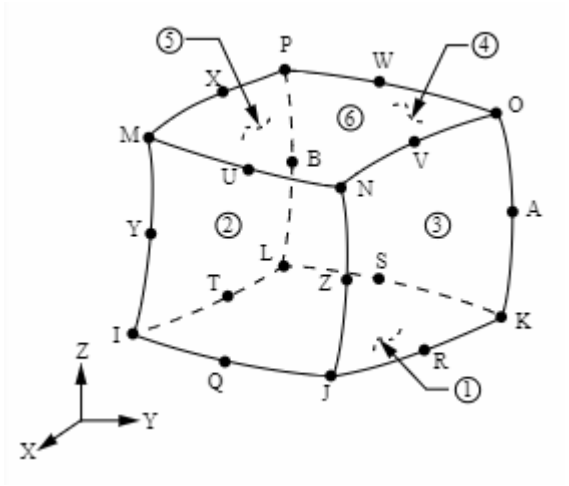
Module 04: Reference Material

Hooke's Law:

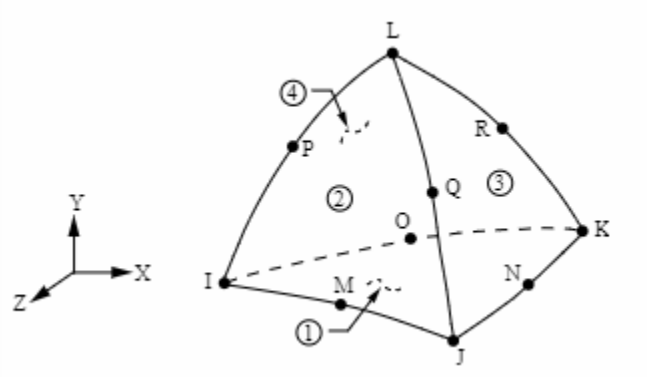
$$F = Kx$$
$$x = F[K]^{-1}$$

For $[K]^{-1}$, requires 10 – 20 GB RAM / 1 Million DOF
For 200,000 nodes → 600,000 DOF → at least 6 GB RAM to solve completely in memory.

Module 04: Reference Material

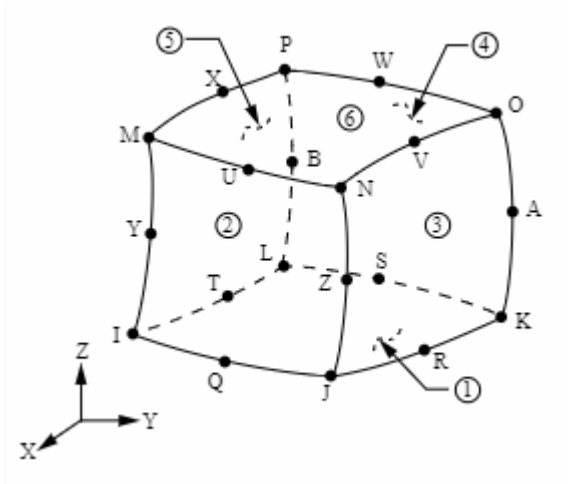


20-Node (Quadratic) Hexahedral Element

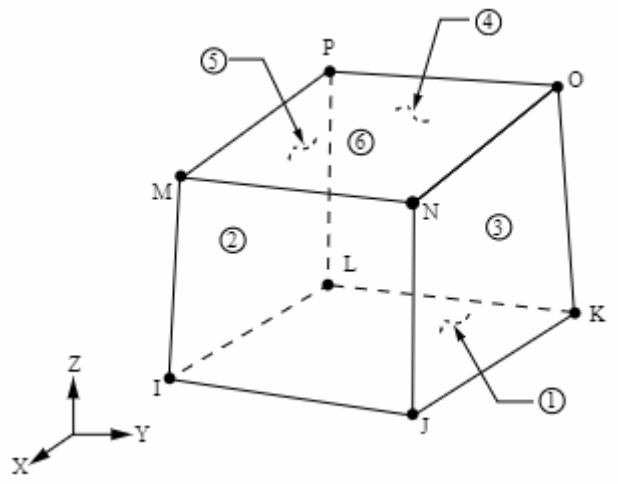


10-Node (Quadratic) Tetrahedral Element

Module 04: Reference Material

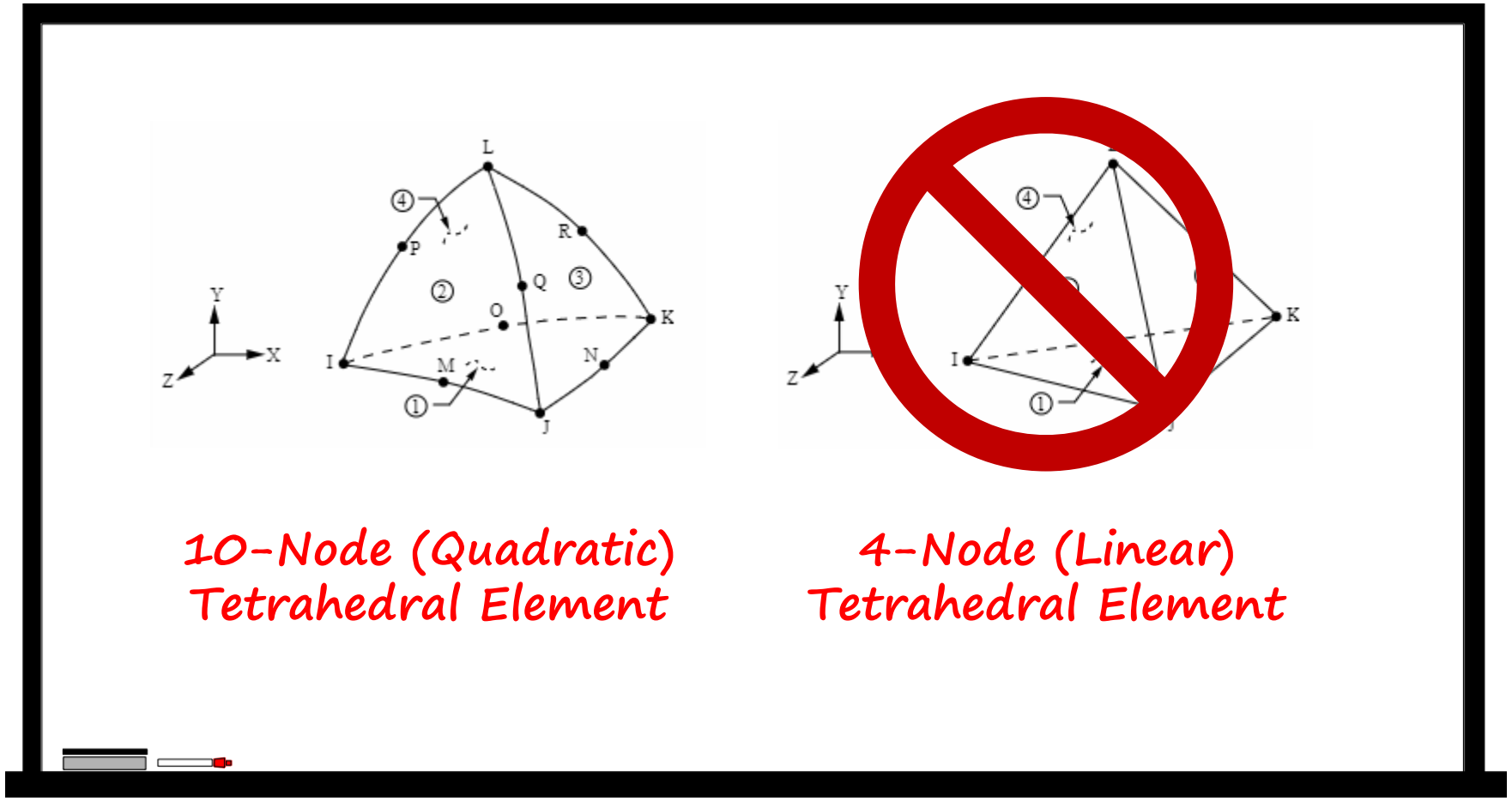


20-Node (Quadratic) Hexahedral Element



8-Node (Linear) Hexahedral Element

Module 04: Reference Material

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