ME 616 Computational Continuum Mechanics (3-0-0-6)

Review of mathematical preliminaries; Kinematics; Stress and Equilibrium equations; Work conjugacy; Concept of stress rates; Constitutive relations for hyperelastic, incompressible and nearly incompressible materials; Rate-independent plasticity: Multiplicative decomposition of finite deformation, rate kinematics, constitutive relations; Variational/weak Formulation for hyperelasticity, incompressibility and rate independent plasticity; Total Lagrangian formulation; Updated Lagrangian formulation; Linearization of equilibrium equations; Integration of constitutive relations and algorithmic tangent modulus; Discretization and solution: discretized kinematics, discretized equilibrium equations, Newton's method, line search method, arc-length method; Computational contact mechanics: general formulation, numerical solution procedures.

Texts/References

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