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general isotropic hyper-elasticity; 4.9 Isotropic linear elasticity; 4.10 Nonlinear isotropic Hooke formulation; 4.11 Plane strain; 4.12 Plane stress; 4.13 Incompressible linear hyper-elasticity; Chapter 5. Cauchy-elasticity; 5.1 Response function, principle of coordinate invariance and isotropic tensor function
 5.2 Most general isotropic Cauchy-elasticity 5.3 Proof of most general form of isotropic Cauchy-elasticity; 5.4 Nonlinear isotropic Hooke formulation; Chapter 6. Representation theorems; 6.1 Scalar functions; 6.2 Second-order tensor functions; 6.3 Thermoelasticity; 6.4 Viscoelasticity; 6.5 Orthotropic linear elasticity; 6.6 Transverse isotropic linear elasticity; Chapter 7. Hypo - elasticity; 7.1 Time-independent response; Chapter 8. Failure and initial yield criteria; 8.1 Haigh-Westergaard coordinate system - Geometrical interpretation of stress invariants
 8.2 Symmetry properties of the failure or initial yield curve in the deviatoric plane 8.3 von Mises criterion; 8.4 Drucker-Prager criterion; 8.5 Coulomb criterion; 8.6 Mohr's failure mode criterion; 8.7 Tresca criterion; 8.8 Experimental results for metals and steel - von Mises versus Tresca; 8.9 Rankine criterion and modified Coulomb criterion; 8.10 Experimental results for concrete versus the modified Coulomb criterion; 8.11 4-parameter criterion; 8.12 Experimental results for concrete versus the 4-parameter criterion; 8.13 Anisotropic criteria; Chapter 9. Introduction to plasticity theory
 9.1 Change of yield surface due to loading - Hardening rules

Sommario/riassunto

Constitutive modelling is the mathematical description of how materials respond to various loadings. This is the most intensely researched field within solid mechanics because of its complexity and the importance of accurate constitutive models for practical engineering problems. Topics covered include: Elasticity - Plasticity theory - Creep theory - The nonlinear finite element method - Solution of nonlinear equilibrium equations - Integration of elastoplastic constitutive equations - The thermodynamic framework for constitutive modelling - Thermoplasticity - Uniqueness and discount