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Approximation, Error Extremization

5.6 Global Theory, Asymptotic Error Estimate5.7 Nonsmooth Data, Theory Generalization; 5.8 Temperature-Dependent Conductivity, Nonlinearity; 5.9 Static Condensation, p-Elements; 5.10 Chapter Summary; Exercises; Computer Labs; References; 6 Engineering Sciences, n = 1: GWSh {Nk()} implementations in the computational engineering sciences; 6.1 Introduction; 6.2 The Euler-Bernoulli Beam Equation; 6.3 Euler-Bernoulli Beam Theory GWSh Reformulation; 6.4 Timoshenko Beam Theory; 6.5 Mechanical Vibrations of a Beam; 6.6 Fluid Mechanics, Potential Flow; 6.7 Electromagnetic Plane Wave Propagation

6.8 Convection-Radiation Finned Cylinder Heat Transfer6.9 Chapter Summary; Exercises; Computer Labs; References; 7 Steady Heat Transfer, n > 1: n = 2, 3 GWSh for D E+ BCs, FE bases, convergence, error mechanisms; 7.1 Introduction; 7.2 Multidimensional FE Bases and DOF; 7.3 Multidimensional FE Operations for {Nk( )}; 7.4 The NCk = 1,2 Basis FE Matrix Library; 7.5 NC Basis {WS}e Template, Accuracy, Convergence; 7.6 The Tensor Product Basis Element Family; 7.7 Gauss Numerical Quadrature, k = 1 TP Basis Library; 7.8 Convection-Radiation BC GWSh Implementation

7.9 Linear Basis GWSh Template Unification

Sommario/riassunto

Approaches computational engineering sciences from the perspective of engineering applications Uniting theory with hands-on computer practice, this book gives readers a firm appreciation of the error mechanisms and control that underlie discrete approximation implementations in the engineering sciences. Key features: Illustrative examples include heat conduction, structural mechanics, mechanical vibrations, heat transfer with convection and radiation, fluid mechanics and heat and mass transportTakes a cross-discipline continuum mechanics viewpoi