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1.3.1 Kinematics of ALE and Space--Time Descriptions 1.3.2 ALE Formulation of Fluid Mechanics; Chapter 2 Basics of the Finite Element Method for Nonmoving-Domain Problems; 2.1 An Abstract Variational Formulation for Steady Problems; 2.2 FEM Applied to Steady Problems; 2.3 Construction of Finite Element Basis Functions; 2.3.1 Construction of Element Shape Functions; 2.3.2 Finite Elements Based on Lagrange Interpolation Functions; 2.3.3 Construction of Global Basis Functions; 2.3.4 Element Matrices and Vectors and their Assembly into the Global Equation System
2.4 Finite Element Interpolation and Numerical Integration2.4.1 Interpolation by Finite Elements; 2.4.2 Numerical Integration; 2.5 Examples of Finite Element Formulations; 2.5.1 Galerkin Formulation of the Advection--Diffusion Equation; 2.5.2 Stabilized Formulation of the Advection--Diffusion Equation; 2.5.3 Galerkin Formulation of Linear Elastodynamics; 2.6 Finite Element Formulation of the Navier--Stokes Equations; 2.6.1 Standard Essential Boundary Conditions; 2.6.2 Weakly Enforced Essential Boundary Conditions; Chapter 3 Basics of the Isogeometric Analysis; 3.1 B-Splines in 1D
3.2 NURBS Basis Functions, Curves, Surfaces, and Solids 3.3 h-, p-, and k-Refinement of NURBS Meshes; 3.4 NURBS Analysis Framework; Chapter 4 ALE and Space-Time Methods for Moving Boundaries and Interfaces; 4.1 Interface-Tracking (Moving-Mesh) and Interface-Capturing (Nonmoving-Mesh) Techniques; 4.2 Mixed Interface-Tracking/Interface-Capturing Technique (MITICT); 4.3 ALE Methods; 4.4 Space-Time Methods; 4.5 Advection-Diffusion Equation; 4.5.1 ALE Formulation; 4.5.2 Space-Time Formulation; 4.6 Navie-Stokes Equations; 4.6.1 ALE Formulation
4.6.2 Generalized-Time Integration of the ALE Equations

Sommario/riassunto

"Computational Fluid-Structure Interaction is a complete, self-contained reference that takes the reader from the fundamentals of computational fluid and solid mechanics all the way to the state-of-the-art in CFSI research"--