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Nota di contenuto	ISOGEOMETRICANALYSIS; Contents; Preface; 1 From CAD and FEA to Isogeometric Analysis: An Historical Perspective; 1.1 Introduction; 1.1.1 The need for isogeometric analysis; 1.1.2 Computational geometry; 1.2 The evolution of FEA basis functions; 1.3 The evolution of CAD representations; 1.4 Things you need to get used to in order to understand NURBS-based isogeometric analysis; Notes; 2 NURBS as a Pre-analysis Tool: Geometric Design and Mesh Generation; 2.1 B-splines; 2.1.1 Knot vectors; 2.1.2 Basis functions; 2.1.3 B-spline geometries; 2.1.4 Refinement; 2.2 Non-Uniform Rational B-Splines 2.2.1 The geometric point of view2.2.2 The algebraic point of view; 2.3 Multiple patches; 2.4 Generating a NURBS mesh: a tutorial; 2.4.1 Preliminary considerations; 2.4.2 Selection of polynomial orders; 2.4.3 Selection of knot vectors; 2.4.4 Selection of control points; 2.5 Notation; Appendix 2.A: Data for the bent pipe; Notes; 3 NURBS as a Basis for Analysis: Linear Problems; 3.1 The isoparametric concept; 3.1.1 Defining functions on the domain; 3.2 Boundary value problems (BVPs); 3.3 Numerical methods; 3.3.1 Galerkin; 3.3.2 Collocation; 3.3.3 Least-squares; 3.3.4 Meshless methods 3.4 Boundary conditions3.4.1 Dirichlet boundary conditions; 3.4.2 Neumann boundary conditions; 3.4.3 Robin boundary conditions; 3.5 Multiple patches revisited; 3.5.1 Local refinement; 3.5.2 Arbitrary topologies; 3.6 Comparing isogeometric analysis with classical finite element analysis; 3.6.1 Code architecture; 3.6.2 Similarities and differences; Appendix 3.A: Shape function routine; Appendix 3.B: Error estimates; Notes; 4 Linear Elasticity; 4.1 Formulating the equations of elastostatics; 4.1.1 Strong form; 4.1.2 Weak form; 4.1.3 Galerkin's method; 4.1.4 Assembly 4.2 Infinite plate with circular hole under constant in-plane tension4.3 Thin-walled structures modeled as solids; 4.3.1 Thin cylindrical shell with fixed ends subjected to constant internal pressure; 4.3.2 The shell obstacle course; 4.3.3 Hyperboloidal shell; 4.3.4 Hemispherical shell with a stiffener; Appendix 4.A: Geometrical data for the hemispherical shell; Appendix 4.B: Geometrical data for a cylindrical pipe; Appendix 4.C: Element assembly routine; Notes; 5 Vibrations andWave Propagation; 5.1 Longitudinal vibrations of an elastic rod; 5.1.1 Formulating the problem 5.1.2 Results: NURBS vs. FEA5.1.3 Analytically computing the discrete spectrum; 5.1.4 Lumped mass approaches; 5.2 Rotation-free analysis of the transverse vibrations of a Bernoulli-Euler beam; 5.3 Transverse vibrations of an elastic membrane; 5.3.1 Linear and nonlinear parameterizations revisited; 5.3.2 Formulation and results; 5.4 Rotation-free analysis of the transverse vibrations of a Poisson-Kirchhoff plate; 5.5 Vibrations of a clamped thin circular plate using three-dimensional solid elements B; 5.5.1 Formulating the problem; 5.5.2 Results; 5.6 The NASA aluminum testbed cylinder 5.7 Wave propagation
Sommario/riassunto	"The authors are the originators of isogeometric analysis, are excellent scientists and good educators. It is very original. There is no other book on this topic."-Rene de Borst, Eindhoven University of Technology Written by leading experts in the field and featuring fully integrated colour throughout, Isogeometric Analysis provides a groundbreaking solution for the integration of CAD and FEA technologies. Tom Hughes and his researchers, Austin Cottrell and Yuri Bazilevs, present their pioneering isogeometric approach, which aims to integrate the two