1. Record Nr. UNINA9910809759603321 Autore Kandelousi Mohsen Sheikholeslami Titolo Hydrothermal analysis in engineering using control volume finite element method / / Mohsen Sheikholeslami Kandelousi, Davood Domairry Ganji Amsterdam, [Netherlands]:,: Academic Press,, 2015 Pubbl/distr/stampa ©2015 **ISBN** 0-08-100361-7 0-12-802950-1 Descrizione fisica 1 online resource (237 p.) Disciplina 620.00151535 Soggetti Finite element method Fluid dynamics - Mathematical models Heat - Transmission - Mathematical models Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Note generali Description based upon print version of record. Nota di bibliografia Includes bibliographical references at the end of each chapters and index. Nota di contenuto Front Cover; Hydrothermal Analysis in Engineering Using Control Volume Finite Element Method; Copyright; Contents; Nomenclature; Preface: Chapter 1: Control volume finite element method (CVFEM): 1.1. Introduction; 1.2. Discretization: Grid, Mesh, and Cloud; 1.2.1. Grid; 1.2.2. Mesh; 1.2.3. Cloud; 1.3. Element and interpolation shape functions; 1.4. Region of support and control volume; 1.5. Discretization and solution; 1.5.1. Steady-State Advection-Diffusion with Source Terms; 1.5.2. Implementation of Source Terms and Boundary Conditions: 1.5.3. Unsteady Advection-Diffusion with Source **Terms** ReferencesChapter 2: CVFEM stream function-vorticity solution; 2.1. CVFEM Stream Function-Vorticity Solution for a Lid-Driven Cavity Flow; 2.1.1. Definition of the Problem and Governing Equation; 2.1.2. The CVFEM Discretization of the Stream Function Equation; 2.1.2.1. Diffusion contributions; 2.1.2.2. Source terms; 2.1.2.3. Boundary conditions; 2.1.3. The CVFEM Discretization of the Vorticity Equation; 2.1.3.1. Diffusion contributions; 2.1.3.2. Advection coefficients;

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Control volume finite element methods (CVFEM) bridge the gap between finite difference and finite element methods, using the advantages of both methods for simulation of multi-physics problems in complex geometries. In Hydrothermal Analysis in Engineering Using Control Volume Finite Element Method, CVFEM is covered in detail and applied to key areas of thermal engineering. Examples, exercises, and extensive references are used to show the use of the technique to model key engineering problems such as heat transfer in nanofluids (to enhance performance and compactness of energy systems), hydro-

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