1. Record Nr. UNINA9910299736803321

Autore	Eslami M. Reza
Titolo	Finite elements methods in mechanics / / by M. Reza Eslami
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2014
ISBN	3-319-08037-7
Edizione	[1st ed. 2014.]
Descrizione fisica	1 online resource (378 p.)
Collana	Solid Mechanics and Its Applications, , 0925-0042 ; ; 216
Disciplina	620.00151535
Soggetti	Mechanics Mechanics, Applied Computer science - Mathematics Mathematical physics Theoretical and Applied Mechanics Computational Science and Engineering Theoretical, Mathematical and Computational Physics
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.
Nota di contenuto	Introduction and History -- Mathematical Foundations -- Finite Element of Elastic Membrane -- Elements and Local Coordinates -- Field Problems -- Conduction Heat Transfer in Solids -- Computer Methods -- Finite Elements of Beams -- Elasticity, Galerkin Formulations -- Elasticity, Variational Formulations -- Torsion of Prismatic Bars -- Thermoelasticity -- Incompressible Viscous Fluid Flow -- One-Dimensional Higher Order Elements -- Two-Dimensional Higher Order Elements -- Coupled Thermoelasticity -- Computer Programs.
Sommario/riassunto	This book covers all basic areas of mechanical engineering, such as fluid mechanics, heat conduction, beams, and elasticity with detailed derivations for the mass, stiffness, and force matrices. It is especially designed to give physical feeling to the reader for finite element approximation by the introduction of finite elements to the elevation of elastic membrane. A detailed treatment of computer methods with numerical examples are provided. In the fluid mechanics chapter, the conventional and vorticity transport formulations for viscous

incompressible fluid flow with discussion on the method of solution are presented. The variational and Galerkin formulations of the heat conduction, beams, and elasticity problems are also discussed in detail. Three computer codes are provided to solve the elastic membrane problem. One of them solves the Poisson's equation. The second computer program handles the two dimensional elasticity problems, and the third one presents the three dimensional transient heat conduction problems. The programs are written in C++ environment.