1. Record Nr. UNINA9910299858203321

Autore	Zohdi Tarek I.
Titolo	A Finite Element Primer for Beginners : The Basics / / by Tarek I. Zohdi
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2015
ISBN	3-319-09036-4
Edizione	[1st ed. 2015.]
Descrizione fisica	1 online resource (113 p.)
Collana	SpringerBriefs in Applied Sciences and Technology, , 2191-530X
Disciplina	620.00151535
Soggetti	Mechanics Mechanics, Applied Fluid mechanics Computational complexity Computer science - Mathematics Mathematical models Physics Solid Mechanics Engineering Fluid Dynamics Complexity Computational Science and Engineering Mathematical Modeling and Industrial Mathematics Numerical and Computational Physics, Simulation
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	Weighted residuals and Galerkin’s method for a generic 1-D problem -- A model problem: 1-D elastostatics -- A finite element implementation in one dimension -- Accuracy of the finite element method -- Element by element iterative solutions schemes -- Weak formulations in three dimensions -- A finite element implementation in three dimensions -- Accuracy of the finite element method -- Time-dependent problems -- Summary and advanced topics.
Sommario/riassunto	The purpose of this primer is to provide the basics of the Finite Element Method, primarily illustrated through a classical model problem, linearized elasticity. The topics covered are: (1) Weighted residual

methods and Galerkin approximations, (2) A model problem for one-dimensional linear elastostatics, (3) Weak formulations in one dimension, (4) Minimum principles in one dimension, (5) Error estimation in one dimension, (5) Construction of Finite Element basis functions in one dimension, (6) Gaussian Quadrature, (7) Iterative solvers and element by element data structures, (8) A model problem for three-dimensional linear elastostatics, (9) Weak formulations in three dimensions, (10) Basic rules for element construction in three-dimensions, (11) Assembly of the system and solution schemes, (12) Assembly of the system and solution schemes, (13) An introduction to time-dependent problems and (14) A brief introduction to rapid computation based on domain decomposition and basic parallel processing.