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Finite Element Modeling and Simulation with *ANSYS Workbench*



Xiaolin Chen • Yijun Liu

Finite Element Modeling And Simulation With Ansys Workbench

Xiaolin Chen, Yijun Liu



Finite Element Modeling And Simulation With Ansys Workbench:

Finite Element Modeling and Simulation with ANSYS Workbench Xiaolin Chen, Yijun Liu, 2018 Finite Element Modeling and Simulation with ANSYS Workbench 18 Second Edition combines finite element theory with real world practice Providing an introduction to finite element modeling and analysis for those with no prior experience and written by authors with a combined experience of 30 years teaching the subject this text presents FEM formulations integrated with relevant hands on instructions for using ANSYS Workbench 18 Incorporating the basic theories of FEA simulation case studies and the use of ANSYS Workbench in the modeling of engineering problems the book also establishes the finite element method as a powerful numerical tool in engineering design and analysis Features Uses ANSYS Workbench tm 18 which integrates the ANSYS SpaceClaim Direct Modeler tm into common simulation workflows for ease of use and rapid geometry manipulation as the FEA environment with full color screen shots and diagrams Covers fundamental concepts and practical knowledge of finite element modeling and simulation with full color graphics throughout Contains numerous simulation case studies demonstrated in a step by step fashion Includes web based simulation files for ANSYS Workbench 18 examples Provides analyses of trusses beams frames plane stress and strain problems plates and shells 3 D design components and assembly structures as well as analyses of thermal and fluid problems *Finite Element Modeling and Simulation with ANSYS Workbench* Xiaolin Chen, Yijun Liu, 2014-08-11 Learn Basic Theory and Software Usage from a Single Volume Finite Element Modeling and Simulation with ANSYS Workbench combines finite element theory with real world practice Providing an introduction to finite element modeling and analysis for those with no prior experience and written by authors with a combined experience of 30 years teaching the subject this text presents FEM formulations integrated with relevant hands on applications using ANSYS Workbench for finite element analysis FEA Incorporating the basic theories of FEA and the use of ANSYS Workbench in the modeling and simulation of engineering problems the book also establishes the FEM method as a powerful numerical tool in engineering design and analysis Include FEA in Your Design and Analysis of Structures Using ANSYS Workbench The authors reveal the basic concepts in FEA using simple mechanics problems as examples and provide a clear understanding of FEA principles element behaviors and solution procedures They emphasize correct usage of FEA software and techniques in FEA modeling and simulation The material in the book discusses one dimensional bar and beam elements two dimensional plane stress and plane strain elements plate and shell elements and three dimensional solid elements in the analyses of structural stresses vibrations and dynamics thermal responses fluid flows optimizations and failures Contained in 12 chapters the text introduces ANSYS Workbench through detailed examples and hands on case studies and includes homework problems and projects using ANSYS Workbench software that are provided at the end of each chapter Covers solid mechanics and thermal fluid FEA Contains ANSYS Workbench geometry input files for examples and case studies Includes two chapters devoted to modeling and solution techniques design optimization fatigue and buckling

failure analysis Provides modeling tips in case studies to provide readers an immediate opportunity to apply the skills they learn in a problem solving context Finite Element Modeling and Simulation with ANSYS Workbench benefits upper level undergraduate students in all engineering disciplines as well as researchers and practicing engineers who use the finite element method to analyze structures

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more systematic view of the chapter subject The following two sections provide more exercises The final section provides review problems Who this book is for This book is designed to be used mainly as a textbook for undergraduate and graduate students It will work well in a finite element simulation course taken before any theory intensive courses an auxiliary tool used as a tutorial in parallel during a Finite Element Methods course an advanced application oriented course taken after a Finite Element Methods course About the Videos Each copy of this book includes access to video instruction In these videos the author provides a clear presentation of tutorials found in the book The videos reinforce the steps described in the book by allowing you to watch the exact steps the author uses to complete the exercises Table of Contents 1 Introduction 2 Sketching 3 2D Simulations 4 3D Solid Modeling 5 3D Simulations 6 Surface Models 7 Line Models 8 Optimization 9 Meshing 10 Buckling and Stress Stiffening 11 Modal Analysis 12 Transient Structural Simulations 13 Nonlinear Simulations 14 Nonlinear Materials 15 Explicit Dynamics Index

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Finite Element Simulations with ANSYS Workbench 12 Huei-Huang Lee, 2010

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Ansys Workbench for Finite Element Analysis Mary Kathryn Thompson, 2020-02-15

The Finite Element Method and Applications in Engineering Using ANSYS® Erdogan Madenci, Ibrahim Guven, 2015-02-10 This textbook offers theoretical and practical knowledge of the finite element method The book equips readers with the skills required to analyze engineering problems using ANSYS a commercially available FEA program Revised and updated this new edition presents the most current ANSYS commands and ANSYS screen shots as well as modeling steps for each example problem This self contained introductory text minimizes the need for additional reference material by covering both the fundamental topics in finite element methods and advanced topics concerning modeling and analysis It focuses on the use of ANSYS through both the Graphics User Interface GUI and the ANSYS Parametric Design Language APDL Extensive examples from a range of engineering disciplines are presented in a straightforward step by step fashion Key topics include An introduction to FEM Fundamentals and analysis capabilities of ANSYS Fundamentals of discretization and approximation functions Modeling techniques and mesh generation in ANSYS Weighted residuals and minimum potential energy Development of macro files Linear structural analysis Heat transfer and moisture diffusion Nonlinear structural problems Advanced subjects such as submodeling substructuring interaction with external files and modification of ANSYS GUI Electronic supplementary material for using ANSYS can be found at <http://link.springer.com/book/10.1007/978-1-4899-7550-8> This convenient online feature which includes color figures screen shots and input files for sample problems allows for regeneration on the reader's own computer Students researchers and practitioners alike will find this an essential guide to predicting and simulating the physical behavior of complex

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