

1. Record Nr.	UNINA9910795815003321
Autore	Cai Liang-Wu
Titolo	Fundamentals of Mechanical Vibrations
Pubbl/distr/stampa	Chicester : , : John Wiley & Sons, Incorporated, , 2016 ©2016
ISBN	9781119050223 9781119050124
Edizione	[1st ed.]
Descrizione fisica	1 online resource (580 pages)
Collana	Wiley-ASME Press Ser.
Disciplina	621.8/11
Soggetti	Vibration - Mathematical models Electronic books.
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Title Page -- Copyright -- Table of Contents -- Series Preface -- Preface -- Chapter 1: A Crash Course on Lagrangian Dynamics -- 1.1 Objectives -- 1.2 Concept of "Equation of Motion" -- 1.3 Generalized Coordinates -- 1.4 Admissible Variations -- 1.5 Degrees of Freedom -- 1.6 Virtual Work and Generalized Forces -- 1.7 Lagrangian -- 1.8 Lagrange's Equation -- 1.9 Procedure for Deriving Equation(s) of Motion -- 1.10 Worked Examples -- 1.11 Linearization of Equations of Motion -- 1.12 Chapter Summary -- Problems -- Chapter 2: Vibrations of Single-DOF Systems -- 2.1 Objectives -- 2.2 Types of Vibration Analyses -- 2.3 Free Vibrations of Undamped System -- 2.4 Free Vibrations of Damped Systems -- 2.5 Using Normalized Equation of Motion -- 2.6 Forced Vibrations I: Steady-State Responses -- 2.7 Forced Vibrations II: Transient Responses -- 2.8 Chapter Summary -- Problems -- Chapter 3: Lumped-Parameter Modeling -- 3.1 Objectives -- 3.2 Modeling -- 3.3 Idealized Elements -- 3.4 Lumped-Parameter Modeling of Simple Components and Structures -- 3.5 Alternative Methods -- 3.6 Examples with Lumped-Parameter Models -- 3.7 Chapter Summary -- Problems -- Chapter 4: Vibrations of Multi-DOF Systems -- 4.1 Objectives -- 4.2 Matrix Equation of Motion -- 4.3 Modal Analysis: Natural Frequencies and Mode Shapes -- 4.4 Free Vibrations -- 4.5 Eigenvalues and

Eigenvectors -- 4.6 Coupling, Decoupling, and Principal Coordinates --  
4.7 Forced Vibrations I: Steady-State Responses -- 4.8 Forced  
Vibrations II: Transient Responses -- 4.9 Chapter Summary --  
Problems -- Reference -- Chapter 5: Vibration Analyses Using Finite  
Element Method -- 5.1 Objectives -- 5.2 Introduction to Finite Element  
Method -- 5.3 Finite Element Analyses of Beams -- 5.4 Vibration  
Analyses Using SOLIDWORKS -- 5.5 Chapter Summary -- Problems --  
Appendix A: Review of Newtonian Dynamics.  
A.1 Kinematics -- A.2 Kinetics -- Appendix B: A Primer on MATLAB --  
B.1 Matrix Computations -- B.2 Plotting -- Appendix C: Tables of  
Laplace Transform -- C.1 Properties of Laplace Transform -- C.2  
Function Transformations -- Index -- End User License Agreement.

---