

1. Record Nr.	UNINA9910131383403321
Autore	Brincker Rune
Titolo	Introduction to operational modal analysis // Rune Brincker, Carlos E. Ventura
Pubbl/distr/stampa	Chichester, England : , : Wiley, , 2015 ©2015
ISBN	1-118-53515-4 1-118-53514-6 1-118-53516-2
Edizione	[1st ed.]
Descrizione fisica	1 online resource (375 p.)
Disciplina	624.171
Soggetti	Modal analysis Structural analysis (Engineering)
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	Cover; Title Page; Copyright; Contents; Preface; Chapter 1 Introduction; 1.1 Why Conduct Vibration Test of Structures?; 1.2 Techniques Available for Vibration Testing of Structures; 1.3 Forced Vibration Testing Methods; 1.4 Vibration Testing of Civil Engineering Structures; 1.5 Parameter Estimation Techniques; 1.6 Brief History of OMA; 1.7 Modal Parameter Estimation Techniques; 1.8 Perceived Limitations of OMA; 1.9 Operating Deflection Shapes; 1.10 Practical Considerations of OMA; 1.11 About the Book Structure; References; Chapter 2 Random Variables and Signals; 2.1 Probability 2.1.1 Density Function and Expectation 2.1.2 Estimation by Time Averaging; 2.1.3 Joint Distributions; 2.2 Correlation; 2.2.1 Concept of Correlation; 2.2.2 Autocorrelation; 2.2.3 Cross Correlation; 2.2.4 Properties of Correlation Functions; 2.3 The Gaussian Distribution; 2.3.1 Density Function; 2.3.2 The Central Limit Theorem; 2.3.3 Conditional Mean and Correlation; References; Chapter 3 Matrices and Regression; 3.1 Vector and Matrix Notation; 3.2 Vector and Matrix Algebra; 3.2.1 Vectors and Inner Products; 3.2.2 Matrices and Outer Products; 3.2.3 Eigenvalue Decomposition

3.2.4 Singular Value Decomposition; 3.2.5 Block Matrices; 3.2.6 Scalar Matrix Measures; 3.2.7 Vector and Matrix Calculus; 3.3 Least Squares Regression; 3.3.1 Linear Least Squares; 3.3.2 Bias, Weighting and Covariance; References; Chapter 4 Transforms; 4.1 Continuous Time Fourier Transforms; 4.1.1 Real Fourier Series; 4.1.2 Complex Fourier Series; 4.1.3 The Fourier Integral; 4.2 Discrete Time Fourier Transforms; 4.2.1 Discrete Time Representation; 4.2.2 The Sampling Theorem; 4.3 The Laplace Transform; 4.3.1 The Laplace Transform as a generalization of the Fourier Transform; 4.3.2 Laplace Transform Properties; 4.3.3 Some Laplace Transforms; 4.4 The Z-Transform; 4.4.1 The Z-Transform as a generalization of the Fourier Series; 4.4.2 Z-Transform Properties; 4.4.3 Some Z-Transforms; 4.4.4 Difference Equations and Transfer Function; 4.4.5 Poles and Zeros; References; Chapter 5 Classical Dynamics; 5.1 Single Degree of Freedom System; 5.1.1 Basic Equation; 5.1.2 Free Decays; 5.1.3 Impulse Response Function; 5.1.4 Transfer Function; 5.1.5 Frequency Response Function; 5.2 Multiple Degree of Freedom Systems; 5.2.1 Free Responses for Undamped Systems; 5.2.2 Free Responses for Proportional Damping; 5.2.3 General Solutions for Proportional Damping; 5.2.4 Transfer Function and FRF Matrix for Proportional Damping; 5.2.5 General Damping; 5.3 Special Topics; 5.3.1 Structural Modification Theory; 5.3.2 Sensitivity Equations; 5.3.3 Closely Spaced Modes; 5.3.4 Model Reduction (SEREP); 5.3.5 Discrete Time Representations; 5.3.6 Simulation of OMA Responses; References; Chapter 6 Random Vibrations; 6.1 General Inputs; 6.1.1 Linear Systems; 6.1.2 Spectral Density; 6.1.3 SISO Fundamental Theorem; 6.1.4 MIMO Fundamental Theorem; 6.2 White Noise Inputs; 6.2.1 Concept of White Noise

Sommario/riassunto

Comprehensively covers the basic principles and practice of Operational Modal Analysis (OMA). Covers all important aspects that are needed to understand why OMA is a practical tool for modal testing. Covers advanced topics, including closely spaced modes, mode shape scaling, mode shape expansion and estimation of stress and strain in operational responses. Discusses practical applications of Operational Modal Analysis. Includes examples supported by MATLAB® applications. Accompanied by a website hosting a MATLAB® toolbox for Operational Modal Analysis.
