1. Record Nr. UNINA9910876676003321

Autore	Preumont Andre
Titolo	Active control of structures / / Andre Preumont, Kazuto Seto
Pubbl/distr/stampa	Chichester, U.K., : John Wiley, 2008
ISBN	1-282-34271-1 9786612342714 0-470-71570-7 0-470-71571-5
Descrizione fisica	1 online resource (314 p.)
Altri autori (Persone)	SetoKazuto
Disciplina	624.1/71
Soggetti	Structural control (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 and index.
Nota di contenuto	Active Control of Structures; Contents; About the Authors; Preface; Acknowledgements; 1 Active Damping; 1.1 Introduction; 1.1.1 Why Suppress Vibrations?; 1.1.2 How can Vibrations be Reduced?; 1.2 Structural Control; 1.3 Plant Description; 1.3.1 Error Budget; 1.4 Equations of Structural Dynamics; 1.4.1 Equation of Motion Including Seismic Excitation; 1.4.2 Modal Coordinates; 1.4.3 Support Reaction, Dynamic Mass; 1.4.4 Dynamic Flexibility Matrix; 1.5 Collocated Control System; 1.5.1 Transmission Zeros and Constrained System; 1.5.2 Nearly Collocated Control System 1.5.3 Non-Collocated Control Systems1.6 Active Damping with Collocated System; 1.6.1 Lead Control; 1.6.2 Direct Velocity Feedback; 1.6.3 Positive Position Feedback; 1.6.4 Integral Force Feedback; 1.6.5 Duality between The Lead and IFF Controllers; 1.7 Decentralized Control with Collocated Pairs; 1.7.1 Cross-Talk; 1.7.2 Transmission Zeros (Case 1); 1.7.3 Transmission Zeros (Case 2); References; 2 Active Isolation; 2.1 Introduction; 2.2 Relaxation Isolator; 2.2.1 Electromagnetic Realization; 2.3 Sky-hook Damper; 2.4 Force Feedback; 2.5 Six-Axis Isolator; 2.5.1 Decentralized Control 2.5.2 Leg Design2.5.3 Model of the Isolator; 2.5.4 Six-Axis Transmissibility; 2.6 Vehicle Active Suspension; 2.6.1 Quarter-Car Model; 2.7 Semi-Active Suspension; 2.7.1 Semi-Active Devices; 2.7.2

Narrow-Band Disturbance; 2.7.3 Quarter-Car Semi-Active Suspension; References; 3 A Comparison of Passive, Active and Hybrid Control; 3.1 Introduction; 3.2 System Description; 3.3 The Dynamic Vibration Absorber; 3.3.1 Single-d.o.f. Oscillator; 3.3.2 Multiple-d.o.f. System; 3.3.3 Shear Frame Example; 3.4 Active Mass Damper; 3.5 Hybrid Control; 3.6 Shear Control; 3.7 Force Actuator, Displacement Sensor
3.7.1 Direct Velocity Feedback3.7.2 First-Order Positive Position Feedback; 3.7.3 Comparison of the DVF and the PPF; 3.8 Displacement Actuator, Force Sensor; 3.8.1 Comparison of the IFF and the DVF; References; 4 Vibration Control Methods and Devices; 4.1 Introduction; 4.2 Classification of Vibration Control Methods; 4.3 Construction of Active Dynamic Absorber; 4.4 Control Devices for Wind Excitation Control in Civil Structures; 4.5 Real Towers Using the Connected Control Method; 4.6 Application of Active Dynamic Absorber for Controlling Vibration of Single-d.o.f. Systems
4.6.1 Equations of Motion and State Equation4.6.2 Representation of a Non-Dimensional State Equation; 4.6.3 Control System Design; 4.6.4 Similarity Law between Dimensional and Non-dimensional System; 4.6.5 Analysis of Vibration Control Effect; 4.6.6 Experiment; 4.7 Remarks; References; 5 Reduced-Order Model for Structural Control; 5.1 Introduction; 5.2 Modeling of Distributed Structures; 5.2.1 Equation of Motion for Distributed Structures; 5.2.2 Conventional Modeling of Structures; 5.3 Spillover; 5.4 The Lumped Modeling Method; 5.4.1 A Key Idea for Deriving a Reduced-Order Model
5.4.2 Relationship Between Physical and Modal Coordinate Systems

Sommario/riassunto

With Active Control of Structures, two global pioneers present the state-of-the-art in the theory, design and application of active vibration control. As the demand for high performance structural systems increases, so will the demand for information and innovation in structural vibration control; this book provides an effective treatise of the subject that will meet this requirement. The authors introduce active vibration control through the use of smart materials and structures, semi-active control devices and a variety of feedback options; they then discuss topics including methods a