1. Record Nr. UNINA9910855372603321

Autore	Lacarbonara Walter
Titolo	Advances in Nonlinear Dynamics, Volume II : Proceedings of the Third International Nonlinear Dynamics Conference (NODYCON 2023) / / edited by Walter Lacarbonara
Pubbl/distr/stampa	Cham : , : Springer Nature Switzerland : , : Imprint : Springer, , 2024
ISBN	9783031506390 3031506391
Edizione	[1st ed. 2024.]
Descrizione fisica	1 online resource (290 pages)
Collana	NODYCON Conference Proceedings Series, , 2730-7697
Disciplina	531
Soggetti	Plasma waves Multibody systems Vibration Mechanics, Applied Dynamics Nonlinear theories System theory Waves, instabilities and nonlinear plasma dynamics Multibody Systems and Mechanical Vibrations Applied Dynamical Systems Engineering Mechanics Complex Systems
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- Preface -- Preface for Volume 2: Nonlinear Dynamics and Control -- Contents -- Part I Control of Nonlinear Systems -- Super-Twisting Sliding Mode Control with Accelerated Gradient Descent Method for Synchronous Reluctance Motor Control System -- 1 Introduction -- 2 Conventional Control System of SynRM -- 2.1 Mathematical SynRM Model -- 2.2 Conventional SynRM Control System -- 2.3 Nonlinear Characteristics of SynRM -- 3 Proposed Speed and Current Vector Control -- 3.1 STSMC for Speed Control -- 3.2 Searching Optimal Current Angle Using AGDM -- 4 Experimental

Results -- 5 Conclusions -- References -- Vibration Control of Time-Varying Nonlinear Systems -- 1 Introduction -- 2 Dynamics of Time-Varying Nonlinear System -- 2.1 Quasi-static Analysis -- 3 Vibration Control -- 4 Numerical Example: Overhead Crane with Simultaneous Traveling and Hoisting Motions -- 4.1 Linear Hoisting and Lowering Operations -- 4.2 Quadratic Hoisting and Lowering Operations -- 5 Conclusion -- References -- Power Consumption Improvement in Position and Attitude Control of Spacecraft Using Electromagnetic Force Assist -- 1 Introduction and Motivation -- 1.1 Overview of RINGS -- 1.2 State-Space Model of the 3-DOF motion platform -- 2 Controller Design -- 2.1 Electromagnetic Assist Using Sliding Mode Control (SMC) -- 2.2 Electromagnetic Assist Using Feedforward Control (FFC) -- 3 Assessment of Power Consumption Improvement When Using Electromagnetic Force Assist -- 3.1 Discussion -- 4 Conclusions -- References -- Some Comments on Nonlinear Dynamic Behavior and Control of a 3rd-order Duffing Oscillator with External Force -- 1 Introduction -- 2 Mathematical Modeling -- 2.1 Nonlinear Dynamics Analysis -- 3 OLFC Control Design -- 4 Conclusions -- References -- Motion Control of a Pendulum via Magnetic Interaction -- 1 Introduction -- 2 Methodology.
2.1 Dynamic System and Equation of Motion -- 2.2 Damping Force -- 2.3 Electromagnetic Force -- 2.4 PD Control -- 3 Results -- 4 Conclusions -- References -- Image-Based Aerial Grasping of a Moving Target Using Model Predictive Control -- 1 Introduction -- 2 Mathematical Modeling -- 3 MPC-NPLT Formulation -- 4 Simulation and Results -- 5 Conclusion -- References -- Efficiency Study of the Non-instantaneous Double Support Phase in HZD Controlled Bipedal Robot -- 1 Introduction -- 2 Robot Model and Control Design -- 3 Efficiency and Stability Study -- 3.1 Comparison of Controllers with Non-instantaneous DSP -- 3.2 Comparison of Non-instantaneous and Instantaneous DSP -- 4 Conclusion -- References -- Aeroelastic Limit Cycle Oscillations Due to Multi-element Control Surface with Freeplay -- 1 Introduction -- 2 Freeplay Inclusion in CS and Tab -- 3 Results -- 4 Final Remarks -- Appendix A Equations of Motion for the Different Scenarios -- References -- The Complete Bifurcation Analysis of Buck Converter Under Current Mode Control -- 1 Introduction -- 2 The Model of the Buck Converter Under Current-Mode Control -- 3 The Complete Bifurcation Analysis of the Converter -- 3.1 Methodology and Tools -- 3.2 Main Parameters of the Buck Converter -- 3.3 Bifurcation Analysis -- 4 Conclusions -- References -- Reversing Along a Curved Path by an Autonomous Truck-Semitrailer Combination -- 1 Introduction -- 2 Mechanical Model -- 2.1 Equations of Motion -- 2.2 Path Following -- 3 Control Algorithm -- 4 Stability Analysis -- 4.1 Linearization -- 4.2 Effect of Curvature -- 5 Simulation -- 6 Conclusion -- References -- Part II Synchronization -- Synchronization of Fractional Discrete-Time Complex Networks with Time Delays via Event-Triggered Strategy -- 1 Introduction -- 2 Preliminaries -- 3 System Models and Problem Formulation -- 4 Main Results -- 5 Simulation.
6 Conclusion -- References -- Mirroring of Synchronization in Multilayer Configuration of Kuramoto Oscillators -- 1 Introduction -- 2 Mathematical Model -- 3 Analytical Insights -- 4 Results for L=1, 2 -- 4.1 Shift in Synchronization Point -- 5 Summary -- References -- Synchronization Based on Intermittent Sampling: PWL Multiscroll System -- 1 Introduction -- 2 Preliminaries -- 2.1 Coupling Scheme -- 3 Problem Statement -- 4 Results -- 5 Discussion and Conclusion -- References -- Part III Nonlinear Vibration Control -- Hoist Stabilization Design Method -- 1 Introduction -- 2 End-User Requirements and

Constraints -- 3 System Design and Construction Plan -- 4 Results -- 5 Summary and Future Work -- References -- The Exact Closed-Form Expressions for Optimum Inertial Amplifier Coupled Nonlinear Friction Bearing Isolators -- 1 Introduction -- 2 Structural Model and Equations of Motion -- 3 H2 Optimization -- 3.1 Inertial Amplifier Coupled Nonlinear Friction Bearing Isolators -- 3.2 Traditional Nonlinear Friction Bearing Isolators -- 4 Robustness of Nonlinear Friction Bearing Isolators -- 5 Dynamic Response Evaluation -- 5.1 Frequency Domain Responses -- 5.2 Time History Analysis -- 6 Summary and Conclusions -- References -- Control of an Acoustic Mode by a Digitally Created Nonlinear Electroacoustic Absorber at Low ExcitationLevels: Experimental Results -- 1 Introduction -- 2 The Electroacoustic Absorber for Noise Control -- 2.1 The Concept of Impedance Control -- 2.2 Working Principle of the Nonlinear Control -- 3 Experimental Results -- 3.1 Open-Field Experimental Results -- 3.2 Control of an Acoustic Mode -- 4 Conclusion -- References -- Preliminary Numerical Analysis of the Vibro-Impact Isolation Systems Under Seismic Excitations -- 1 Introduction -- 2 Model and Equations of Motion -- 3 Optimal Design of Vibro-Impact Isolation Systems -- 4 Results.
5 Conclusions and Future Developments -- References -- Maneuvering a Stick in Three-Dimensional Space Using Impulsive Forces -- 1 Introduction -- 2 Problem Description -- 3 Hybrid Dynamic Model -- 3.1 Poincaré Map in Inertial Reference Frame -- 3.2 Poincaré Map in the Reference Frame of the Juggler -- 4 Control Design -- 4.1 Steady-State Dynamics -- 4.2 Hybrid Orbit Stabilization -- 4.3 Time Variation of the Hybrid Orbit -- 5 Simulations -- 5.1 Changing the Height of the Orbit -- 5.2 Increase in Time of Flight -- 5.3 Simultaneous Change in Orbit Parameters * and * -- 6 Conclusions -- References -- Mitigating Vibration Levels of Mistuned Cyclic Structures by Use of Contact Nonlinearities -- 1 Introduction -- 2 Cyclic Symmetry Properties -- 2.1 Preliminaries on the Property of Cyclic Symmetry -- 2.2 Coupling Due to Nonlinear Forces -- 2.3 Coupling Due to Random Mistuning -- 3 Reduction Methodologies -- 3.1 Substructuring Nonlinear Cyclic Reduction -- 3.2 Accelerated Monte-Carlo Simulation -- 4 Results -- 4.1 Mechanical System Under Study -- 4.2 Statistical Study -- 5 Conclusion -- References -- Part IV Sensors and Actuators -- Evaluating the Shape of a Deformed PVDF Wearable Pressure Sensors by Analyzing an Acoustic Traveling Wave -- 1 Introduction -- 2 Geometry -- 3 Simulation -- 3.1 The Parameters in COMSOL -- 3.2 Material Orientation -- 4 Results and Discussion -- 4.1 Results for Zero Orientation -- 4.2 Effect of Curvature -- 5 Conclusion -- References -- Sensing Sound with Electrospun Piezo Materials on a 3D-Printed Structure -- 1 Introduction -- 2 Design and Fabrication of the Hybrid Functional Cell -- 3 Results and Discussion -- 4 Conclusions -- References -- Part V Passive Energy Damping -- Free Balls in a Non-rotating Track Can Mitigate Rotor Vibration -- 1 Introduction -- 2 Model Description -- 3 Experimental Investigation.
3.1 Primary Rotor System -- 3.2 Design and Fabrication of the Modified NES -- 3.3 Methodology -- 4 Results and Discussion -- 5 Conclusions -- References -- Vibro-Impact NES: Nonlinear Mode Approximation Using the Multiple Scales Method -- 1 Introduction -- 2 Model Description -- 3 Multiple Scales Method -- 4 Nonlinear Mode Identification -- 5 Numerical Experiments and Simulation Results -- 6 Conclusion -- References -- Vibration Damping in Fiber-Reinforced Bistable Composites with Magnetic Particles -- 1 Introduction -- 2 Material Design -- 3 Experimental -- 3.1 Materials and Fabrication -- 3.2 Test Setup -- 4 Result and Discussion -- 5 Conclusions -- References -- Magnetic Field and Ferrite Particles Interaction for

Membranes with Augmented Shock-Absorption Capability -- 1 Introduction -- 2 Materials and Methods -- 3 Results and Discussion -- 3.1 Numerical Study -- 3.2 Experimental Study: Microparticles' Agglomerates -- 3.3 Magnetized Membrane -- 4 Conclusions -- References -- Index.

Sommario/riassunto

This volume aims to present cutting-edge methodologies and approaches bridging the gap between nonlinear dynamics and control, encompassing a diverse array of experimental, analytical, and computational strategies. Topics include: Exploration of nonlinear effects on vibration control systems Passive, semi-active, and active control methods for structures and systems Synchronization phenomena Integration of robotics and human-machine interactions within dynamic control systems Control strategies for network dynamics Event-triggered control strategies Control with time delays Multi-agent systems, leader-follower dynamics Vibro-impact systems.