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| Autore | Convegno internazionale di studi su Properzio <2008 : Assisi> |
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| Altri autori (Persone) | Cristofoli, Roberto<br>Santini, Carlo<br>Santucci, Francesco |
| Soggetti | Spazio e tempo nella letteratura - Congressi<br>Propertio, Sesto Congressi<br>Propertio, Sesto Congressi |
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| Pubbl/distr/stampa | Singapore : , : Springer, , [2022]<br>2022 |
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| Nota di contenuto | Intro -- Preface -- Contents -- Acronyms and Symbols -- List of Figures -- List of Tables -- 1 Introduction -- 1.1 Linear and Nonlinear Actuators -- 1.2 Applications of Synthetic Jet Actuators -- 1.2.1 Synthetic Jet Actuators in Active Cooling -- 1.2.2 Synthetic Jet Actuators for Flight Control -- References -- 2 Synthetic Jet Actuators and Arrays: Modeling and Control -- 2.1 Physical Characteristics -- 2.2 Virtual Shaping and Flow Separation Control of Airfoils -- 2.3 Mathematical Models -- 2.4 Adaptive Inverse Compensation and Update Laws -- 2.4.1 Adaptive Inverse Function -- 2.4.2 Adaptive Update Signals -- 2.4.3 Stability Analysis -- 2.5 Performance Evaluation of SJA -- 2.6 Inverse Compensation for Actuator Arrays -- 2.6.1 Control Error Formulation -- 2.6.2 Adaptive Estimation of Uncertain Parameters -- 2.6.3 Robustness Issues -- 2.7 System Performance Evaluation with SJAA -- References -- 3 Adaptive Compensation at Low Angles of Attack: Nonlinear Aircraft Model -- 3.1 Nonlinear Aircraft System: A Benchmark Model -- 3.2 Feedback Control Law Design -- 3.2.1 Velocity Control -- 3.2.2 Flight Path Angle Dynamics -- 3.2.3 Wind Axis Angle Dynamics -- 3.2.4 Body Axis Rate Dynamics -- 3.3 Performance Analysis -- 3.4 Results and Discussions |

-- References -- 4 Adaptive Compensation at High Angles of Attack -- 4.1 Synthetic Jet Actuator Model Development -- 4.2 Nonlinearity Model of Synthetic Jet Actuators -- 4.2.1 Nonlinearity Models with Partially Known Parameters -- 4.2.2 Nonlinearity Models with Unknown Parameters -- 4.3 Adaptive Inverse Compensation Techniques -- 4.3.1 Adaptive Inverse Compensation: Exact Actuator Model -- 4.3.2 Adaptive Inverse Compensator: Approximate Model -- References -- 5 Signal-Dependent Uncertainty Compensation: A General Framework -- 5.1 Signal-Dependent Nonlinearity Compensation -- 5.1.1 Adaptive Inverse Function.
5.1.2 Control Error Expression -- 5.1.3 Estimation of the Model Mismatch Term -- 5.2 Adaptive Inverse Control System -- 5.3 Adaptation Scheme -- 5.4 Performance Evaluation -- References -- 6 NN-Based High-Order Adaptive Compensation Framework for Signal Dependencies -- 6.1 Higher-Order Inverse Parametrization Schemes -- 6.1.1 Neural Network Based Inverse Parametrization -- 6.1.2 Approximation Error Analysis -- 6.2 A Benchmark Pitch-Plane Control System -- 6.3 Parameter Adaptation and Stability Analysis -- References -- 7 Adaptive Synthetic Jet Actuation for Aircraft Control -- 7.1 Wide-Range Angles of Attack Model -- 7.2 Adaptive Inverse Design of Actuator Nonlinearities -- 7.2.1 Control Error Expression -- 7.3 Nonlinear Aircraft Control Law Development -- 7.4 Adaptation Scheme -- 7.5 Performance Analysis -- 7.6 Concluding Remarks -- References.

Sommario/riassunto

This book provides a basic understanding of adaptive control and its applications in Flight control. It discusses the designing of an adaptive feedback control system and analyzes this for flight control of linear and nonlinear aircraft models using synthetic jet actuators. It also discusses control methodologies and the application of control techniques which will help practicing flight control and active flow control researchers. It also covers modelling and control designs which will also benefit researchers from the background of fluid mechanics and health management of actuation systems.The unique feature of this book is characterization of synthetic jet actuator nonlinearities over a wide range of angles of attack, an adaptive compensation scheme for such nonlinearities, and a systematic framework for feedback control of aircraft dynamics with synthetic jet actuators.