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| Nota di contenuto | Preface; Acknowledgements; Contents; Acronyms; 1 Fault Tolerant Control; 1.1 Fault and Failure and Their Classification; 1.1.1 Modeling Faults and Failures; 1.2 Fault Detection and Isolation (FDI); 1.3 Fault Tolerant Control Systems; 1.3.1 Passive Fault Tolerant Control Systems; 1.3.2 Active Fault Tolerant Control Systems; 1.3.3 Control Allocation; 1.4 Summary; 1.5 Notes and References; References; 2 Integral Sliding Mode Control; 2.1 Introduction; 2.2 Problem Statement and Equivalent Control; 2.2.1 Sliding Mode Control Laws; 2.3 Reachability Problem; 2.4 A Simple Simulation Example<br>2.4.1 Spring Mass Damper System2.4.2 Simulation Objective and SMC Design; 2.4.3 Simulation Results; 2.5 Practical Sliding Mode Control Law; 2.6 Properties of the Sliding Mode; 2.7 Integral Sliding Mode Control (ISMC); 2.7.1 Introduction; 2.7.2 Problem Statement and ISM Controller Design; 2.7.3 Design Principles; 2.7.4 Integral Switching Surface; 2.7.5 Integral Sliding Mode Control Laws; 2.7.6 The Reachability Condition; 2.7.7 Properties of Integral Sliding Mode; 2.7.8 Simulation Example; 2.8 Sliding Modes as a Candidate for FTC; 2.9 Notes and References; References<br>3 Design and Analysis of an Integral Sliding Mode Fault Tolerant |

Sommario/riassunto

The key attribute of a Fault Tolerant Control (FTC) system is its ability to maintain overall system stability and acceptable performance in the face of faults and failures within the feedback system. In this book Integral Sliding Mode (ISM) Control Allocation (CA) schemes for FTC are described, which have the potential to maintain close to nominal fault-free performance (for the entire system response), in the face of actuator faults and even complete failures of certain actuators.
Broadly an ISM controller based around a model of the plant with the aim of creating a nonlinear fault tolerant feedback controller whose closed-loop performance is established during the design process. The second approach involves retro-fitting an ISM scheme to an existing feedback controller to introduce fault tolerance. This may be advantageous from an industrial perspective, because fault tolerance can be introduced without changing the existing control loops. A high fidelity benchmark model of a large transport aircraft is used to demonstrate the efficacy of the FTC schemes. In particular a scheme based on an LPV representation has been implemented and tested on a motion flight simulator.