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| Altri autori (Persone) | XiaYuanqing |
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| Nota di contenuto | Analysis and Synthesis of  Fault-Tolerant Control Systems; Contents; Preface; Acknowledgments; 1 Introduction; 1.1 Overview; 1.2 Basic Concepts of Faults; 1.3 Classification of Fault Detection Methods; 1.3.1 Hardware redundancy based fault detection; 1.3.2 Plausibility test; 1.3.3 Signal-based fault diagnosis; 1.3.4 Model-based fault detection; 1.4 Types of Fault-Tolerant Control System; 1.5 Objectives and Structure of AFTCS; 1.6 Classification of Reconfigurable Control Methods; 1.6.1 Classification based on control algorithms; 1.6.2 Classification based on field of application<br>1.7 Outline of the Book1.7.1 Methodology; 1.7.2 Chapter organization; 1.8 Notes; References; References; References; References; References; References; References; References; 2 Fault Diagnosis and Detection; 2.1 Introduction; 2.2 Related Work; 2.2.1 Model-based schemes; 2.2.2 Model-free schemes; 2.2.3 Probabilistic schemes; 2.3 Integrated Approach; 2.3.1 Improved multi-sensor data fusion; 2.3.2 Unscented transformation; 2.3.3 Unscented Kalman filter; 2.3.4 Parameter estimation; 2.3.5 Multi-sensor integration architectures; 2.4 Robust Unscented Kalman Filter; 2.4.1 Introduction |

2.4.2 Problem formulation2.4.3 Residual generation; 2.4.4 Residual evaluation; 2.5 Quadruple Tank System; 2.5.1 Model of the QTS; 2.5.2 Fault scenarios in QTS; 2.5.3 Implementation structure of UKF; 2.5.4 UKF with centralized multi-sensor data fusion; 2.5.5 UKF with decentralized multi-sensor data fusion; 2.5.6 Drift detection; 2.6 Industrial Utility Boiler; 2.6.1 Steam flow dynamics; 2.6.2 Drum pressure dynamics; 2.6.3 Drum level dynamics; 2.6.4 Steam temperature; 2.6.5 Fault model for the utility boiler; 2.6.6 Fault scenarios in the utility boiler
2.6.7 UKF with centralized multi-sensor data fusion2.6.8 UKF with decentralized multi-sensor data fusion; 2.6.9 Drift detection; 2.6.10 Remarks; 2.7 Notes; References; 3 Robust Fault Detection; 3.1 Distributed Fault Diagnosis; 3.1.1 Introduction; 3.1.2 System model; 3.1.3 Distributed FDI architecture; 3.1.4 Distributed fault detection method; 3.1.5 Adaptive thresholds; 3.1.6 Distributed fault isolation method; 3.1.7 Adaptive thresholds for DFDI; 3.1.8 Fault detectability condition; 3.1.9 Fault isolability analysis; 3.1.10 Stability and learning capability; 3.2 Robust Fault Detection Filters
3.2.1 Reference model3.2.2 Design of adaptive threshold; 3.2.3 Iterative update of noise mean and covariance; 3.2.4 Unscented transformation (UT); 3.2.5 Car-like mobile robot application; 3.3 Simultaneous Fault Detection and Control; 3.3.1 Introduction; 3.3.2 System model; 3.3.3 Problem formulation; 3.3.4 Simultaneous fault detection and control problem; 3.3.5 Two-tank system simulation; 3.4 Data-Driven Fault Detection Design; 3.4.1 Introduction; 3.4.2 Problem formulation; 3.4.3 Selection of weighting matrix; 3.4.4 Design of FDF for time-delay system; 3.4.5 LMI design approach
3.4.6 Four-tank system simulation

Sommario/riassunto

In recent years, control systems have become more sophisticated in order to meet increased performance and safety requirements for modern technological systems. Engineers are becoming more aware that conventional feedback control design for a complex system may result in unsatisfactory performance, or even instability, in the event of malfunctions in actuators, sensors or other system components. In order to circumvent such weaknesses, new approaches to control system design have emerged which can tolerate component malfunctions while maintaining acceptable stability and performance. These