1. Record Nr. UNINA9910830171903321

Autore	Grimble Michael J
Titolo	Robust industrial control systems [[electronic resource]] : optimal design approach for polynomial systems / / Michael J. Grimble
Pubbl/distr/stampa	Chichester ; ; Hoboken, NJ, : Wiley, c2006
ISBN	0-470-02075-X 1-280-44874-1 9786610448746 0-470-02074-1
Descrizione fisica	1 online resource (700 p.)
Disciplina	629.8312 670.42/7 670.427
Soggetti	Process control - Automation
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	Robust Industrial Control Systems; Contents; Preface; Acknowledgements; 1 Introduction to Optimal and Robust Control; 1.1 Introduction; 1.1.1 Optimality, Feedback and Robustness; 1.1.2 High-integrity and Fault-tolerant Control Systems; 1.1.3 Self-healing Control Systems; 1.1.4 Fault Monitoring and Detection; 1.1.5 Adaptive versus Robust Control; 1.1.6 Artificial Intelligence, Neural Networks and Fuzzy Control; 1.1.7 Discrete-time Systems; 1.2 The H2 and H-infinity Spaces and Norms; 1.2.1 Graphical Interpretation of the H-infiinity Norm 1.2.2 Terms Used in H-infinity Robust Control Systems Design1.3 Introduction to H-infinity Control Design; 1.3.1 Properties of H-infinity Robust Control Design; 1.3.2 Comparison of H-infinity and H2/LQG Controllers; 1.3.3 Relationships between Classical Design and H-infinity Robust Control; 1.3.4 H2 and H-infinity Design and Relationship to PID Control; 1.3.5 H-infinity Polynomial Systems Synthesis Theory; 1.4 State-space Modelling and Synthesis Theory; 1.4.1 State-space Solution of Discrete-time H-infinity Control Problem; 1.4.2 H-infinity Control Design Objectives 1.4.3 State-feedback Control Solution1.4.4 State-feedback Control

Problem: Cross-product Costing Case; 1.4.5 State-space Solution of Discrete-time H-infinity Filtering Problem; 1.4.6 Bounded Real Lemma; 1.4.7 Output Feedback H-infinity Control Problem; 1.5 Introduction to H2 or LQG Polynomial Synthesis; 1.5.1 System Description; 1.5.2 Cost Function and Solution; 1.5.3 Minimisation of the Performance Criterion; 1.5.4 Solution of the Diophantine Equations and Stability; 1.5.5 H2 /LQG Design Examples; 1.6 Benchmarking; 1.6.1 Restricted Structure Benchmarking
2.3.1 Solution of the Dual-criterion Minimisation Problem2.3.2 Theorem Summarising LQG Controller; 2.3.3 Remarks on the Equations and Solution; 2.3.4 Design Guidelines; 2.3.5 Controller Implementation; 2.3.6 LQG Ship-steering Autopilot Application; 2.4 LQG Controller with Robust Weighting Function; 2.4.1 Youla Parameterisation; 2.4.2 Cost Function with Robust Weighting Function; 2.4.3 Solution of the Dual-criterion Problem with Robust Weighting; 2.4.4 Summary of H2 /LQG Synthesis Problem with Robust Weighting; 2.4.5 Comments on the Solution; 2.5 Introduction to the Standard System Model
2.5.1 Standard System Model

Sommario/riassunto

Robust Industrial Control Systems: Optimal Design Approach for Polynomial Systems presents a comprehensive introduction to the use of frequency domain and polynomial system design techniques for a range of industrial control and signal processing applications. The solution of stochastic and robust optimal control problems is considered, building up from single-input problems and gradually developing the results for multivariable design of the later chapters. In addition to cataloguing many of the results in polynomial systems needed to calculate industrial controllers and filters, basic