

1. Record Nr.	UNINA9910830586303321
Autore	Fickelscherer Richard J
Titolo	Optimal automated process fault analysis [[electronic resource] /] / Richard J. Fickelscherer ; Daniel L. Chester
Pubbl/distr/stampa	Hoboken, N.J., : John Wiley and Sons, Inc., 2013
ISBN	1-118-48195-X 1-283-91735-1 1-118-48193-3 1-118-48196-8
Descrizione fisica	1 online resource (226 p.)
Altri autori (Persone)	ChesterDaniel L
Disciplina	660.2815 660/.2815 670
Soggetti	Chemical process control - Data processing Fault location (Engineering) - Data processing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	"AIChE."
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Optimal Automated Process Fault Analysis; Contents; Foreword; Preface; Acknowledgments; 1 Motivations for Automating Process Fault Analysis; 1.1 Introduction; 1.2 CPI Trends to Date; 1.3 The Changing Role of Process Operators in Plant Operations; 1.4 Methods Currently Used to Perform Process Fault Management; 1.5 Limitations of Human Operators in Performing Process Fault Management; 1.6 The Role of Automated Process Fault Analysis; 1.7 Anticipated Future CPI Trends; 1.8 Process Fault Analysis Concept Terminology; References; 2 Method of Minimal Evidence: Model-Based Reasoning; 2.1 Overview 2.2 Introduction2.3 Method of Minimal Evidence Overview; 2.3.1 Process Model and Modeling Assumption Variable Classifications; 2.3.2 Example of a MOME Primary Model; 2.3.3 Example of MOME Secondary Models; 2.3.4 Primary Model Residuals' Normal Distributions; 2.3.5 Minimum Assumption Variable Deviations; 2.3.6 Primary Model Derivation Issues; 2.3.7 Method for Improving the Diagnostic Sensitivity of the Resulting Fault Analyzer; 2.3.8 Intermediate Assumption Deviations, Process Noise, and Process Transients; 2.4 Verifying the

Validity and Accuracy of the Various Primary Models; 2.5 Summary  
References  
3 Method of Minimal Evidence: Diagnostic Strategy Details;  
3.1 Overview; 3.2 Introduction; 3.3 MOME Diagnostic Strategy; 3.3.1  
Example of MOME SV&PFA Diagnostic Rules' Logic; 3.3.2 Example of  
Key Performance Indicator Validation; 3.3.3 Example of MOME SV&PFA  
Diagnostic Rules with Measurement Redundancy; 3.3.4 Example of  
MOME SV&PFA Diagnostic Rules for Interactive Multiple-Faults; 3.4  
General Procedure for Developing and Verifying Competent Model-  
Based Process Fault Analyzers; 3.5 MOME SV&PFA Diagnostic Rules'  
Logic Compiler Motivations; 3.6 MOME Diagnostic Strategy Summary  
References  
4 Method of Minimal Evidence: Fuzzy Logic Algorithm; 4.1  
Overview; 4.2 Introduction; 4.3 Fuzzy Logic Overview; 4.4 MOME Fuzzy  
Logic Algorithm; 4.4.1 Single-Fault Fuzzy Logic Diagnostic Rule; 4.4.2  
Multiple-Fault Fuzzy Logic Diagnostic Rule; 4.5 Certainty Factor  
Calculation Review; 4.6 MOME Fuzzy Logic Algorithm Summary;  
References;  
5 Method of Minimal Evidence: Criteria for Shrewdly  
Distributing Fault Analyzers and Strategic Process Sensor Placement;  
5.1 Overview; 5.2 Criteria for Shrewdly Distributing Process Fault  
Analyzers; 5.2.1 Introduction  
5.2.2 Practical Limitations on Target Process System Size  
5.2.3 Distributed Fault Analyzers; 5.3 Criteria for Strategic Process Sensor  
Placement; References;  
6 Virtual SPC Analysis and Its Routine Use in FALCONEERTM IV;  
6.1 Overview; 6.2 Introduction; 6.3 EWMA  
Calculations and Specific Virtual SPC Analysis Configurations; 6.3.1  
Controlled Variables; 6.3.2 Uncontrolled Variables and Performance  
Equation Variables; 6.4 Virtual SPC Alarm Trigger Summary; 6.5 Virtual  
SPC Analysis Conclusions; References;  
7 Process State Transition Logic  
and Its Routine Use in FALCONEERTM IV  
7.1 Temporal Reasoning Philosophy

---

## Sommario/riassunto

Automated fault analysis is not widely used within chemical processing industries due to problems of cost and performance as well as the difficulty of modeling process behavior at needed levels of detail. In response, this book presents the method of minimal evidence (MOME), a model-based diagnostic strategy that facilitates the development and implementation of optimal automated process fault analyzers. With this book as their guide, readers have a powerful new tool for ensuring the safety and reliability of any chemical processing system.

---