DESCRIPTION

Process Control System Fault Diagnosis: A Bayesian Approach

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Data-driven Inferential Solutions for Control System Fault Diagnosis

A typical modern process system consists of hundreds or even thousands of control loops, which are overwhelming for plant personnel to monitor. The main objectives of this book are to establish a new framework for control system fault diagnosis, to synthesize observations of different monitors with a prior knowledge, and to pinpoint possible abnormal sources on the basis of Bayesian theory.

Process Control System Fault Diagnosis: A Bayesian Approach consolidates results developed by the authors, along with the fundamentals, and presents them in a systematic way. The book provides a comprehensive coverage of various Bayesian methods for control system fault diagnosis, along with a detailed tutorial. The book is useful for graduate students and researchers as a monograph.
and as a reference for state-of-the-art techniques in control system performance monitoring and fault diagnosis. Since several self-contained practical examples are included in the book, it also provides a place for practicing engineers to look for solutions to their daily monitoring and diagnosis problems.

Key features:

• A comprehensive coverage of Bayesian Inference for control system fault diagnosis.

• Theory and applications are self-contained.

• Provides detailed algorithms and sample Matlab codes.

• Theory is illustrated through benchmark simulation examples, pilot-scale experiments and industrial application.

Process Control System Fault Diagnosis: A Bayesian Approach is a comprehensive guide for graduate students, practicing engineers, and researchers who are interests in applying theory to practice.

🙏 ABOUT THE AUTHOR

Ruben Gonzalez completed his Bachelor's degree in chemical engineering in 2008 at the University of New Brunswick. Under the supervision of Dr. Biao Huang, he completed his Master's degree in 2010 and his Doctorate in 2014, both in chemical engineering, at the University of Alberta. His research interests include Bayesian diagnosis, fault detection and diagnosis, data reconciliation, and applied kernel density estimation.

Fei Qi obtained his Ph.D. degree in Process Control from the University of Alberta, Canada, in 2011. He had his M.Sc. degree (2006) and B.Sc. degree (2003) in Automation from the University of Science and Technology of China. Fei Qi joined Suncor Energy Inc. in 2010 as an Advance Process Control Engineer. He has extensive experiences in applying system identification, model predictive control, and control performance monitoring in real industrial processes. His Ph.D. research was on applying Bayesian statistics to control loop diagnosis. His current research interests include model predictive control, soft sensor, fault detection, and process optimization.
Biao Huang obtained his PhD degree in Process Control from the University of Alberta, Canada, in 1997. He is currently a Professor in the Department of Chemical and Materials Engineering, University of Alberta, NSERC Industrial Research Chair in Control of Oil Sands Processes and AITF Industry Chair in Process Control. He is a Fellow of the Canadian Academy of Engineering, Fellow of the Chemical Institute of Canada, and recipient of numerous awards including Germany’s Alexander von Humboldt Research Fellowship, Bantrel Award in Design and Industrial Practice, APEGGA Summit Award in Research Excellence, best paper award from Journal of Process Control etc. Biao Huang’s main research interests include: Bayesian inference, control performance assessment, fault detection and isolation. Biao Huang has applied his expertise extensively in industrial practice. He also serves as the Deputy Editor-in-Chief for Control Engineering Practice, the Associate Editor for Canadian Journal of Chemical Engineering and the Associate Editor for Journal of Process Control.

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