

FAULT DIAGNOSIS AND SUSTAINABLE CONTROL OF WIND TURBINES

In order to improve the safety, reliability, and efficiency of wind turbine systems, thus avoiding expensive unplanned maintenance, the accommodation of faults in their early occurrence is fundamental. *Fault Diagnosis and Sustainable Control of Wind Turbines: Robust data-driven and model-based strategies* thus summarizes the development of reliable and robust fault diagnosis and fault tolerant control schemes by means of data-driven and model-based approaches. The strategies proposed are able to cope with unknown nonlinear systems and manage measurement errors and noise. To highlight the potential of the proposed methods in real applications, Hardware-In-the-Loop test facilities representing realistic wind turbine systems are considered to analyze the digital implementation of the designed solutions.

The book targets both professional engineers working in industry and researchers in academic and scientific institutions. Readers ranging from industrial engineers wishing to gain insight into the applications potential of new fault diagnosis and sustainable control methods, to the academic control community looking for new problems to tackle will find much to learn from this work.

Key Features

- Analyzes wind turbine models that are used as benchmarks for the proposed solutions.
- Addresses the design, development, and realistic implementation of fault diagnosis and fault tolerant control strategies for wind turbine systems.
- Proposes active fault tolerant (the so-called “sustainable”) solutions that are able to maintain the wind turbine working conditions with gracefully degraded performance before the required maintenance can occur.
- Presents full coverage of the diagnosis and fault tolerant control problem, starting from the modeling and identification and finalizing with diagnosis and fault tolerant control approaches.
- Provides MATLAB and Simulink codes for the solutions proposed by the authors.

About the author

Silvio Simani

Dr. Silvio Simani received his Laurea degree (cum laude) in Electronic Engineering from the Department of Engineering at the University of Ferrara, Italy, in 1996, and was awarded the PhD degree in Information Science (Automatic Control) at the Department of Engineering of the University of Ferrara and Modena, Italy, in 2000. Since February 2002 he has been an Assistant Professor at the Department of Engineering of the University of Ferrara. He has published about 240 refereed journal and conference papers, several book chapters, and 3 monographs. His research interests include fault diagnosis and fault tolerant control of linear and nonlinear dynamic processes, system modeling, identification and data analysis, linear and nonlinear filtering techniques, fuzzy logic and neural networks for modeling and control, as well as the interaction issues among identification, fault diagnosis, and fault tolerant control.

Saverio Farsoni

Saverio Farsoni was born in Mirandola (MO, Italy) in 1987. In 2012 He graduated (cum laude) in Informatics and Automation Engineering at the University of Ferrara with an MSc thesis on simulations in bio-medical environments. Since 2013 he has been a PhD student in Engineering Science and, together with his supervisor, Dr. Simani, has been working on control systems, fuzzy logic, and modeling and identification problems. In particular, his research deals with fault diagnosis and fault tolerant control for eolic plants, and he has published a few conference papers on these issues.



Butterworth-Heinemann
An imprint of Elsevier
elsevier.com/books-and-journals



Simani
Farsoni

FAULT DIAGNOSIS AND SUSTAINABLE CONTROL OF WIND TURBINES

FAULT DIAGNOSIS AND SUSTAINABLE CONTROL OF WIND TURBINES

Robust Data-Driven and Model-Based Strategies

Silvio Simani
Saverio Farsoni

