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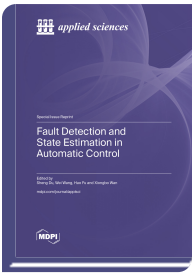
Special Issue Reprint

Fault Detection and State Estimation in Automatic Control



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ISBN 978-3-0365-9756-0 (Hardback)
ISBN 978-3-0365-9757-7 (PDF)

Fault detection and state estimation are essential tasks for ensuring the reliability, safety and performance of automatic control systems. They play a critical role in detecting and isolating faults quickly and accurately, enabling timely corrective action and preventing system failures. The field of fault detection and state estimation has seen significant advances in recent years, driven by the integration of advanced methodologies with cutting-edge technologies, in particular artificial intelligence and deep learning. These techniques have demonstrated remarkable capabilities in fault diagnosis, state estimation and fault-tolerant control, especially in complex multi-sensor systems.

This Special Issue highlights and discusses the design and application of fault detection algorithms, the design and application of state estimation methods, the design and application of machine learning algorithms, the analysis of automatic control system characteristics, and the design and application of intelligent control systems. Nevertheless, many challenges remain and require attention, including scalability, computational efficiency, online implementation, fault isolation, fault recovery and fault-tolerant control. Additional research efforts are therefore essential to advance both the theory and practice of this critical task.

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