



Process Control and Identification

By W. Fred Ramirez

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With today's competition in the high-tech industries, and the continuing need for material and energy conservation, hazard free operation, and environmentally safe discharges, it has become increasingly important to develop and apply methodologies and techniques that lead to improved performance and operations.

Process Control and Identification presents the time domain approach to modern process control, which allows for the formulation of precise performance objectives that can be extremized.

Important topics covered include model predictive control from an optimal control point of view, the use of state and parameter identification for implementation of optimal adaptive control, a variational approach to development of necessary conditions for defining optimal control problems, and the treatment of both regulatory control and time optimal control for industrial processes. Practical examples are given throughout to illustrate theoretical concepts. MATLAB, the software package that enables the solution of many optimal control problems, is used for the solution of many text examples. Computational issues as well as interpretation of results are stressed. Exercises are provided at the end of each chapter to facilitate self-study and as use as a text. With its comprehensive coverage and many examples, **Process Control and Identification** will be a valuable resource for practicing process control engineers and students.

Variational approach to process optimal control

Comprehensive treatment of optimal regulatory control including measurable, unmeasurable, and partially measurable load disturbances

Treatment of optimal process control problems linear in the control variables leading to bang-bang control laws

Presents discrete optimal control problems important to computer control algorithms

Develops process identification algorithms from a variational perspective

Use of sequential least squares for parameter identification.

Applications of the linear quadratic Gaussian problem (LQG) for the adaptive control of uncertain processes

Illustrative practical process examples throughout the text, many using MATLAB(r) software

Over 60 exercises to facilitate self-study and use as a text

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