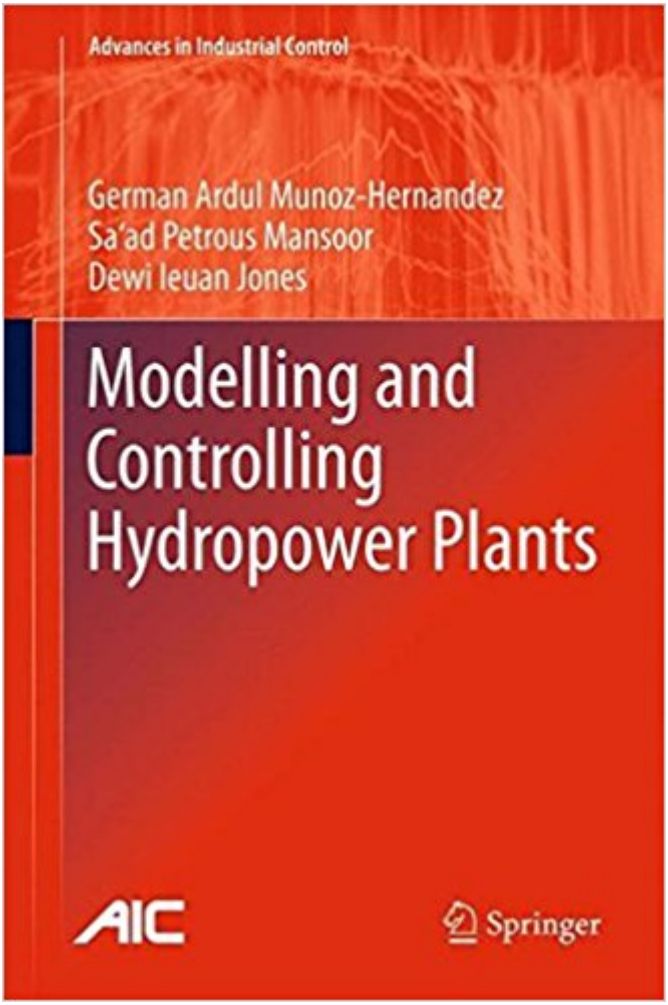
Modelling And Controlling Hydropower Plants (Advances In Industrial Control)



Synopsis

Hydroelectric power stations are a major source of electricity around the world; understanding their dynamics is crucial to achieving good performance. The electrical power generated is normally controlled by individual feedback loops on each unit. The reference input to the power loop is the grid frequency deviation from its set point, thus structuring an external frequency control loop. The book discusses practical and well-documented cases of modelling and controlling hydropower stations, focused on a pumped storage scheme based in Dinorwig, North Wales. These accounts are valuable to specialist control engineers who are working in this industry. In addition, the theoretical treatment of modern and classic controllers will be useful for graduate and final year undergraduate engineering students. This book reviews SISO and MIMO models, which cover the linear and nonlinear characteristics of pumped storage hydroelectric power stations. The most important dynamic features are discussed. The verification of these models by hardware in the loop simulation is described. To show how the performance of a pumped storage hydroelectric power station can be improved, classical and modern controllers are applied to simulated models of Dinorwig power plant, that include PID, Fuzzy approximation, Feed-Forward and Model Based Predictive Control with linear and hybrid prediction models.

Book Information

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Customer Reviews

Hydroelectric power stations are a major source of electricity around the world; understanding their

dynamics is crucial to achieving good performance. Ã Â Modelling and Controlling Hydropower Plants discusses practical and well-documented cases of modelling and controlling hydropower station modelling and control, focussing on a pumped storage scheme based in Dinorwig, North Wales.Ã Â Single-input-single-output and multiple-input-multiple-output models, which cover the linear and nonlinear characteristics of pump-storage hydroelectric power stations, are reviewed. The most important dynamic features are discussed, and the verification of these models by hardware in the loop simulation is described. To show how the performance of a pump-storage hydroelectric power station can be improved, classical and modern controllers are applied to simulated models of the Dinorwig power plant. These include PID, fuzzy approximation, feed-forward and model-based predictive control with linear and hybrid prediction models.Modelling and Controlling Hydropower Plants will be of value to control engineers working in industry. In addition, the theoretical treatment of modern and classic controllers will be useful for academic researchers and graduate students in control and power engineering.Advances in Industrial Control aims to report and encourage the transfer of technology in control engineering. The rapid development of control technology has an impact on all areas of the control discipline. The series offers an opportunity for researchers to present an extended exposition of new work in all aspects of industrial control.

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