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**Back cover information**

The classical Model Predictive Control (MPC) approach to control dynamical systems described by the Wiener model uses an inverse static block to cancel the influence of process nonlinearity. Unfortunately, the model's structure is limited and it gives poor control quality in the case of an imperfect model and disturbances. An alternative is to use the computationally demanding MPC scheme with on-line nonlinear optimisation repeated at each sampling instant.

This book presents computationally efficient MPC solutions. A linear approximation of the Wiener model or the predicted trajectory is found on-line. As a result, quadratic optimisation tasks are obtained. Furthermore, parameterisation using Laguerre functions is possible to reduce the number of decision variables. Simulation results for ten benchmark processes show that the discussed MPC algorithms lead to excellent control quality. For a neutralisation reactor and a fuel cell, essential advantages of neural Wiener models are demonstrated.

**Keywords:** process control, model predictive control, Wiener models, linearisation, Laguerre parameterisation, optimisation, neural networks, polynomials.