

Predictive Control

Classical, Robust and Stochastic

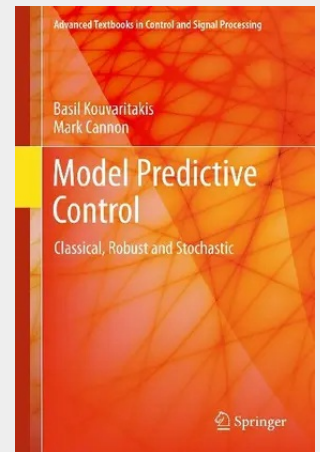
For the first time, a textbook that brings together classical predictive control with treatment of up-to-date robust and stochastic techniques.

Model Predictive Control describes the development of tractable algorithms for uncertain, stochastic, constrained systems. The starting point is classical predictive control and the appropriate formulation of performance objectives and constraints to provide guarantees of closed-loop stability and performance. Moving on to robust predictive control, the text explains how similar guarantees may be obtained for cases in which the model describing the system dynamics is subject to additive disturbances and parametric uncertainties. Open- and closed-loop optimization are considered and the state of the art in computationally tractable methods based on uncertainty tubes presented for systems with additive model uncertainty. Finally, the tube framework is also applied to model predictive control problems involving hard or probabilistic constraints for the cases of multiplicative and stochastic model uncertainty. The book provides:

- extensive use of illustrative examples;
- sample problems; and
- discussion of novel control applications such as resource allocation for sustainable development and turbine-blade control for maximized power capture with simultaneously reduced risk of turbulence-induced damage.

Graduate students pursuing courses in model predictive control or more generally in advanced or process control and senior undergraduates in need of a specialized treatment will find *Model Predictive Control* an invaluable guide to the state of the art in this important subject. For the instructor it provides an authoritative resource for the construction of courses.

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