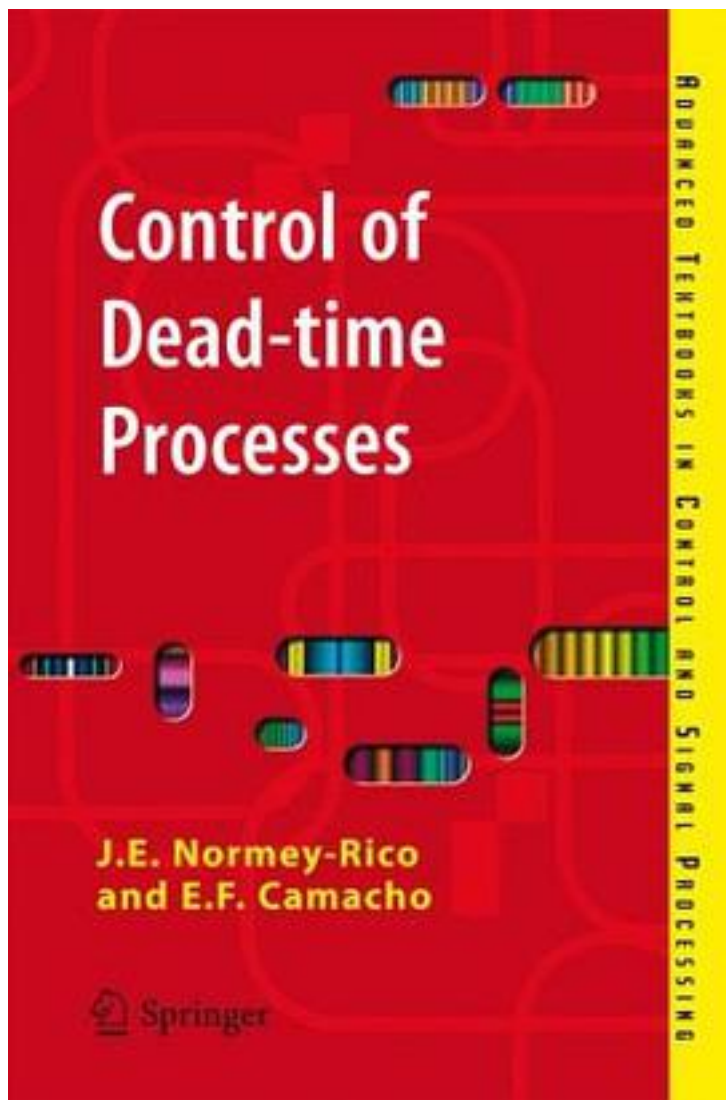


Control of Dead-Time Processes



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Industrial processes and engineering, economic and biological systems commonly exhibit time delays or dead times. Dead time complicates the analysis and design of control systems and makes satisfactory control more difficult. Control of Dead-time Processes introduces the fundamental techniques for controlling dead-time processes ranging from simple monovariable to complex multivariable cases. Solutions to dead-time-process-control problems are studied using classical proportional-integral-differential (PID) control for the simpler examples and dead-time-compensator (DTC) and model predictive control (MPC) methods for progressively more complex ones. Although MPC and DTC approaches originate in different areas of control, both use predictors to overcome the effects of dead time. Using this fact, the text analyses MPC as a dead-time-compensation strategy and shows how it can be used synergistically with robust DTC tuning methodologies. Graduate students working for their masters or PhDs in automatic control, chemical, electronic or mechanical engineering, in which dead-time processes are prevalent, will gain particular benefit from the following features of this text: interlinked study of PID, DTC and MPC for dead-time processes in a single source; exercises and further reading for each chapter; extensive use of illustrations, tables and examples; case studies based on real industrial problems with solutions that are simple to understand and easy to implement; MATLAB code developed by the authors to help analyse and control dead-time processes including code for all the examples in the book available for download from the Web. Control of Dead-time Processes will also be of interest to control researchers and process control engineers. Chapters 1-8 of the text can be used as part of the final-year course for undergraduates in control or process engineering.

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目录:

[Control of Dead-Time Processes_ 下载链接1](#)

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评论

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