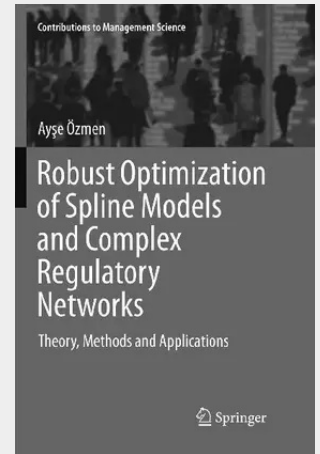


Robust Optimization of Spline Models and Complex Regulatory Networks

Theory, Methods and Applications

This book introduces methods of robust optimization in multivariate adaptive regression splines (MARS) and Conic MARS in order to handle uncertainty and non-linearity. The proposed techniques are implemented and explained in two-model regulatory systems that can be found in the financial sector and in the contexts of banking, environmental protection, system biology and medicine. The book provides necessary background information on multi-model regulatory networks, optimization and regression. It presents the theory of and approaches to robust (conic) multivariate adaptive regression splines - R(C)MARS - and robust (conic) generalized partial linear models - R(C)GPLM - under polyhedral uncertainty. Further, it introduces spline regression models for multi-model regulatory networks and interprets (C)MARS results based on different datasets for the implementation. It explains robust optimization in these models in terms of both the theory and methodology. In this context it studies R(C)MARS results with different uncertainty scenarios for a numerical example. Lastly, the book demonstrates the implementation of the method in a number of applications from the financial, energy, and environmental sectors, and provides an outlook on future research.

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