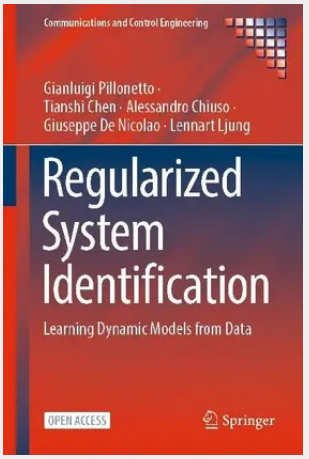
Pillonetto / Chen / Chiuso

# Regularized System Identification

Learning Dynamic Models from Data




This open access book provides a comprehensive treatment of recent developments in kernel-based identification that are of interest to anyone engaged in learning dynamic systems from data. The reader is led step by step into understanding of a novel paradigm that leverages the power of machine learning without losing sight of the system-theoretical principles of black-box identification. The authors' reformulation of the identification problem in the light of regularization theory not only offers new insight on classical questions, but paves the way to new and powerful algorithms for a variety of linear and nonlinear problems. Regression methods such as regularization networks and support vector machines are the basis of techniques that extend the function-estimation problem to the estimation of dynamic models. Many examples, also from real-world applications, illustrate the comparative advantages of the new nonparametric approach with respect to classic parametric prediction error methods.
The challenges it addresses lie at the intersection of several disciplines so *Regularized System Identification* will be of interest to a variety of researchers and practitioners in the areas of control systems, machine learning, statistics, and data science.

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**53,49 €**
49,99 € (zzgl. MwSt.)

*Lieferfrist: bis zu 10 Tage*

**Artikelnummer:** 9783030958596
**Medium:** Buch
**ISBN:** 978-3-030-95859-6
**Verlag:** Springer
**Erscheinungstermin:** 14.05.2022
**Sprache(n):** Englisch
**Auflage:** 1. Auflage 2022
**Serie:** Communications and Control Engineering
**Produktform:** Gebunden
**Gewicht:** 843 g
**Seiten:** 377
**Format (B x H):** 160 x 241 mm



**Kundenservice Verlag Dr. Otto Schmidt KG**
Neumannstraße 10, 40235 Düsseldorf | kundenservice@otto-schmidt.de | 0221-93738-997 (Inland)