

# Springer Series in Information Sciences

Editors: T. S. Huang, T. Kohonen, M. R. Schroeder

Volume 7

M. R. Schroeder

## Number Theory in Science and Communication

With Applications in Cryptography, Physics, Digital Information, Computing, and Self-Similarity

2nd enlarged edition 1986. 81 figures.

XIX, 374 pages.

Soft cover DM 68,-. ISBN 3-540-15800-6

The subject of this book is the application of number theory to practical problems in physics, digital information processing, computing, cryptography, acoustics, crystallography (quasicrystals), fractals and self-similarity. The purpose of the book is to widen the horizon of readers with a minimum of mathematical training to the basic facts of number theory. The topic is treated informally, stressing intuition rather than formal proofs.

The most important and surprising feature of the book is that there are so many applications of a field which is traditionally considered rather abstract. The benefit that the reader can expect to derive from the book is a deep appreciation of the usefulness of finite mathematics and its multi-faceted interactions with the real world.

The second edition includes much new material on self-similarity, fractals, quasicrystals, Cantor sets, Hausdorff dimensions, deterministic chaos, error-free computation, spread-spectrum communication systems, optimal ambiguity functions for radar and sonar, and new material on Fibonacci numbers.

Volume 14

P. A. Ruymgaart, University of Technology, Delft, The Netherlands;

T. T. Soong, State University of New York, Buffalo, NY, USA

## Mathematics of Kalman-Bucy Filtering

2nd edition 1988. 19 figures. XII, 170 pages.

Soft cover DM 59,-. ISBN 3-540-18781-2

This book is designed for readers who are well versed in the practice of Kalman-Bucy filters. The main topic in this book is the continuous-time Kalman-Bucy filter. The mathematics needed consists mainly of operations in Hilbert spaces. A relatively complete treatment of mean square calculus is given, followed by a treatment of the stochastic differential equations central to the modeling. The mathematical theory of the Kalman-Bucy filter is then introduced.

Volume 17

C. K. Chui, Texas A&M University, TX;

G. Chen, Rice University, TX, USA

## Kalman Filtering

with Real-Time Applications

1987. 18 figures. XV, 191 pages.

Hard cover DM 67,50. ISBN 3-540-18395-7

This book presents a thorough discussion of the mathematical theory of Kalman filtering. The filtering equations are derived in a series of elementary steps enabling the optimality of the process to be understood.

Springer-Verlag

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