



# Nonlinear Stochastic Systems with Incomplete Information: Filtering and Control

*Bo Shen, Zidong Wang, Huisheng Shu*

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Nonlinear Stochastic Processes addresses the frequently-encountered problem of incomplete information. The causes of this problem considered here include: missing measurements; sensor delays and saturation; quantization effects; and signal sampling.

Divided into three parts, the text begins with a focus on  $H^\infty$  filtering and control problems associated with general classes of nonlinear stochastic discrete-time systems. Filtering problems are considered in the second part, and in the third the theory and techniques previously developed are applied to the solution of issues arising in complex networks with the design of sampled-data-based controllers and filters.

Among its highlights, the text provides:

- a unified framework for filtering and control problems in complex communication networks with limited bandwidth;
- new concepts such as random sensor and signal saturations for more realistic modeling; and
- demonstration of the use of techniques such as the Hamilton–Jacobi–Isaacs, difference linear matrix, and parameter-dependent matrix inequalities and sums of squares to handle the computational challenges inherent in these systems.

The collection of recent research results presented in Nonlinear Stochastic Processes will be of interest to academic researchers in control and signal processing. Graduate students working with communication networks with lossy information and control of stochastic systems will also benefit from reading the book.

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