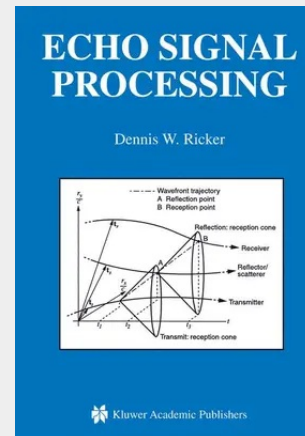


Echo Signal Processing

This book presents basic and advanced topics in the areas of signal theory and processing as applied to acoustic echo-location (sonar). It is written at the advanced undergraduate or graduate level, and assumes that the reader is conversant with the concepts and mathematics associated with introductory graduate courses in signal processing such as linear and complex algebra, Fourier analysis, probability, advanced calculus, and linear system theory. The material is presented in a tutorial fashion as a logical development starting with basic principles and leading to the development of topics in detection and estimation theory, waveform design, echo modeling, scattering theory, and spatial processing. Examples are provided throughout the book to illustrate important concepts and especially important relationships are boxed. The book addresses the practical aspects of receiver and waveform design, and therefore should be of interest to the practicing engineer as well as the student. Although much of the book is applicable to the general echo-location problem that includes radar, its emphasis is on acoustic echo location especially in regard to time mapping and the wideband or wavelet description of Doppler. Introductory signal theory material is included in the first chapter to provide a foundation for the material covered in the later chapters. A consistent notational convention is observed throughout the book so that the various mathematical entities are readily identified. This is described in the glossary and symbol list.

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213,99 €

199,99 € (zzgl. MwSt.)

Lieferfrist: bis zu 10 Tage

Artikelnummer: 9781402073953

Medium: Buch

ISBN: 978-1-4020-7395-3

Verlag: Springer

Erscheinungstermin: 28.02.2003

Sprache(n): Englisch

Auflage: 2003

Serie: The Springer International Series in Engineering and Computer Science

Produktform: Gebunden

Gewicht: 1970 g

Seiten: 484

Format (B x H): 160 x 241 mm

