1. **Record Nr.** UNINA9910299904603321

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   Titolo Information Loss in Deterministic Signal Processing Systems / / by Bernhard C. Geiger, Gernot Kubin

   Pubbl/distr/stampa Cham : , : Springer International Publishing : , : Imprint : Springer, , 2018

   ISBN 3-319-59533-4

   Edizione [1st ed. 2018.]

   Descrizione fisica 1 online resource (XIII, 145 p. 16 illus., 9 illus. in color.)

   Collana Understanding Complex Systems, , 1860-0832

   Disciplina 621.3822

   Soggetti Computational complexity
   Signal processing
   Image processing
   Speech processing systems
   Statistical physics
   Dynamical systems
   Complexity
   Signal, Image and Speech Processing
   Complex Systems

   Lingua di pubblicazione Inglese

   Formato Materiale a stampa

   Livello bibliografico Monografia

   Nota di contenuto Introduction -- Part I: Random Variables -- Piecewise Bijective Functions and Continuous Inputs -- General Input Distributions -- Dimensionality-Reducing Functions -- Relevant Information Loss -- II. Part II: Stationary Stochastic Processes -- Discrete-Valued Processes -- Piecewise Bijective Functions and Continuous Inputs -- Dimensionality-Reducing Functions -- Relevant Information Loss Rate -- Conclusion and Outlook.

   Sommario/riassunto This book introduces readers to essential tools for the measurement and analysis of information loss in signal processing systems. Employing a new information-theoretic systems theory, the book analyzes various systems in the signal processing engineer's toolbox: polynomials, quantizers, rectifiers, linear filters with and without quantization effects, principal components analysis, multirate systems, etc. The user benefit of signal processing is further highlighted with the

concept of relevant information loss. Signal or data processing operates on the physical representation of information so that users can easily access and extract that information. However, a fundamental theorem in information theory—data processing inequality—states that deterministic processing always involves information loss. These measures form the basis of a new information-theoretic systems theory, which complements the currently prevailing approaches based on second-order statistics, such as the mean-squared error or error energy. This theory not only provides a deeper understanding but also extends the design space for the applied engineer with a wide range of methods rooted in information theory, adding to existing methods based on energy or quadratic representations.