1.	Record Nr.	UNINA9910254641703321
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	Titolo	Analog and Digital Signal Analysis : From Basics to Applications / / by Frédéric Cohen Tenoudji
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2016
	ISBN	3-319-42382-7
	Edizione	[1st ed. 2016.]
	Descrizione fisica	1 online resource (XXIII, 608 p. 256 illus., 9 illus. in color.)
	Collana	Modern Acoustics and Signal Processing, , 2364-4915
	Disciplina	534
	Soggetti	Acoustics
		Signal processing
		Image processing
		Speech processing systems
		Fourier analysis
		Electrical engineering
		Information theory
		Signal, Image and Speech Processing
		Fourier Analysis
		Communications Engineering, Networks
		Information and Communication, Circuits
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di contenuto	Notions on Systems -- First and Second Order Systems -- Fourier Series -- The Dirac Distribution -- Fourier Transform -- Fourier Transform and LTI Filter Systems -- Fourier Transforms and Convolution Calculations -- Impulse Response of LTI Systems.-Laplace Transform -- Analog Filters -- Causal Signals - Analytic Signals -- Time-Frequency Analysis -- Notions On Digital Signals.-Discrete Systems – Moving Average Systems.-Z -Transform -- Fourier Transform Of Digital Signals -- Autoregressive Systems (Ar) - Arma Systems -- Minimum Phase Systems; Deconvolution -- Wavelets; Multiresolution Analysis -- Parametric Estimation - Modelisation Of Deterministic Signals - Linear Prediction -- Random Signals – Statistics Basis -- Multiple Random Variables- Linear Regression – Maximum

Likelihood Estimation -- Correlation And Covariance Matrices Of A Complex Random Vector.-Correlation Functions - Power Spectral Densites Of Random Signals -- Ergodicity; Temporal And Spectral Estimations -- Parametric Modeling Of Random Signals.-Optimal Filtering –Wiener, Kalman, Filters -- Appendix 1. Appendix 2 -- Appendix 3 -- Bibliography -- Index.   .

Sommario/riassunto	This book provides comprehensive, graduate-level treatment of analog and digital signal analysis suitable for course use and self-guided learning. This expert text guides the reader from the basics of signal theory through a range of application tools for use in acoustic analysis, geophysics, and data compression. Each concept is introduced and explained step by step, and the necessary mathematical formulae are integrated in an accessible and intuitive way. The first part of the book explores how analog systems and signals form the basics of signal analysis. This section covers Fourier series and integral transforms of analog signals, Laplace and Hilbert transforms, the main analog filter classes, and signal modulations. Part II covers digital signals, demonstrating their key advantages. It presents z and Fourier transforms, digital filtering, inverse filters, deconvolution, and parametric modeling for deterministic signals. Wavelet decomposition and reconstruction of non-stationary signals are also discussed. The third part of the book is devoted to random signals, including spectral estimation, parametric modeling, and Tikhonov regularization. It covers statistics of one and two random variables and the principles and methods of spectral analysis. Estimation of signal properties is discussed in the context of ergodicity conditions and parameter estimations, including the use of Wiener and Kalman filters. Two appendices cover the basics of integration in the complex plane and linear algebra. A third appendix presents a basic Matlab toolkit for computer signal analysis. This expert text provides both a solid theoretical understanding and tools for real-world applications. Presents the core principles of analog and digital signal analysis Discusses applications to geophysics, acoustic analysis, and data compression Features worked examples, problem sets, and extensive appendices.