



METADATA

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Abstract

This textbook includes a comprehensive and self-contained presentation of continuous- and discrete-time signals and systems and their transformations. It begins with discrete-time signals and systems, considering that understanding the initial concepts is easier in discrete time (sequences) instead of continuous time (functions). Then, it presents the same concepts in continuous time, followed by the concept of frequency. At this point, we believe that it is easier to understand the subsequent concepts in continuous time, that is why in the chapters where we study the signals in the frequency domain, the concepts are presented first in continuous time and then in discrete. After analyzing the concept of frequency, the book devotes a chapter to Fourier series of (first continuous-time, then discrete-time) periodic signals. Then, the Fourier transform of

aperiodic signals and the Nyquist sampling theorem are presented. The latter unifies, in a way, continuous time with discrete time. Also, to unify the concepts of continuous- and discrete-time Fourier series and Fourier transform, we analyze the duality between discrete signals in the time (or frequency) domain and periodic signals in the frequency (or time) domain, respectively. We believe that this is important for a deep understanding of the concepts. A separate chapter is devoted to analog modulation, targeting in the application of important properties of the Fourier transform to telecommunications. The Laplace, discrete Fourier, and z transforms follow. The book comprehensively addresses the range of signal transforms, starting from simple ones (Fourier series) and developing them to end up with complex ones (Laplace transform and z transform).

