Waveform Analysis of Sound
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This book is a welcome addition to the literature on waveform analysis. The book is useful for not only students of acoustics but also the students involved in mathematical understanding of signals and the applications of Fourier analysis. The author recommends all readers to have an introductory background of basics of signal processing theory.

There are nine chapters in the book. Each chapter is very well structured. Chapter 1 provides a very nice overview of the book. This is very helpful to the reader as it provides a good summary of the book's content. Chapter 2 describes mathematical expressions and operations of the representation of discrete sequences. The chapter includes convolution, correlation, z-transforms and Fourier transforms. In Chapter 3, temporal and spectral characteristics of discrete sequences are described. This chapter includes triangular windowing and auto-correlation sequence. Chapter 4 describes temporal and spectral enhancement by sound path. This chapter includes a formulation with respect to the power spectral density and auto-correlation analysis in both time and frequency domains of sound radiation from a source into a room.

Chapter 5 examines modulation and periodic properties of temporal envelope. Speech intelligibility is considered in detail through interesting experimental results related to intelligibility, narrow-band temporal envelopes, and the frame-wise magnitude and phase spectral properties of speech samples.

The fundamental basis of waveform analysis is linear systems theory, and Chapter 6 deals in detail with the frequency response of a linear system in terms of the poles and zeros of the transfer function. Sampling theorem and the discrete Fourier transform (DFT) are described in Chapter 7. This chapter formulates the discrete Fourier transform as the solution of a set of simultaneous linear equations for which the orthogonality of the sinusoidal sequence holds. Chapter 8 describes the sinusoidal representation of sequence. This chapter also develops a method called clustered line spectral modeling which, in principle, gives the spectral estimate for the true sinusoidal components in the observation interval. In waveform analysis, the identification of source signature represented by zeros is an important issue. The last chapter, Chapter 9, discusses the occurrences of zeros of the transfer function in the complex frequency plane. This chapter provides the theoretical correspondence between the complex time and frequency planes with respect to the representation of analytic signals.

Each chapter includes a list of excellent references. It would have been a bonus to have both example problems in the chapters and assignment problems for each chapter. The figures are very clear. Overall, the book is highly useful for not only acoustical engineers but also all engineers that deal with waveform analysis.

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