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Nota di contenuto	Machine generated contents note: 1.1.Audio Content -- 1.2.A Generalized Audio Content Analysis System -- 2.1.Audio Signals -- 2.1.1.Periodic Signals -- 2.1.2.Random Signals -- 2.1.3.Sampling and Quantization -- 2.1.4.Statistical Signal Description -- 2.2.Signal Processing -- 2.2.1.Convolution -- 2.2.2.Block-Based Processing -- 2.2.3.Fourier Transform -- 2.2.4.Constant Q Transform -- 2.2.5. Auditory Filterbanks -- 2.2.6.Correlation Function -- 2.2.7.Linear Prediction -- 3.1.Audio Pre-Processing -- 3.1.1.Down-Mixing -- 3.1.2. DC Removal -- 3.1.3.Normalization -- 3.1.4.Down-Sampling -- 3.1.5. Other Pre-Processing Options -- 3.2.Statistical Properties -- 3.2.1. Arithmetic Mean -- 3.2.2.Geometric Mean -- 3.2.3.Harmonic Mean -- 3.2.4.Generalized Mean -- 3.2.5.Centroid -- 3.2.6.Variance and Standard Deviation -- 3.2.7.Skewness -- 3.2.8.Kurtosis -- 3.2.9. Generalized Central Moments -- 3.2.10.Quantiles and Quantile Ranges -- 3.3.Spectral Shape -- 3.3.1.Spectral Rolloff -- Contents note continued: 3.3.2.Spectral Flux -- 3.3.3.Spectral Centroid -- 3.3.4.Spectral Spread -- 3.3.5.Spectral Decrease -- 3.3.6.Spectral Slope -- 3.3.7.Mel Frequency Cepstral Coefficients -- 3.4.Signal

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## Sommario/riassunto

An easily accessible, hands-on approach to digital audio signal processing. With the proliferation of digital audio distribution over digital media, the amount of easily accessible music is ever-growing, requiring new tools for navigating, accessing, and retrieving music in meaningful ways. An understanding of audio content analysis is

essential for the design of intelligent music information retrieval applications and content-adaptive audio processing systems. This book is about how to teach a computer to interpret music signals, thus allowing the design of tools for interacting with music. This book serves as a comprehensive guide on audio content analysis and how to apply it in signal processing and music informatics. Written by a well-known expert in the music industry, An Introduction to Audio Content Analysis ties together topics from audio signal processing and machine learning, showing how to use audio content analysis to pick up musical characteristics automatically. The author clearly explains the analysis of audio signals and the extraction of metadata describing the content of the signal, covering both abstract descriptions of technical properties and musical descriptions such as tempo, harmony and key, musical style, and performance attributes. Musical information is given a separate analysis in each category, whether tonal, pitch, harmony, key, temporal, or tempo, among others. Readers will get access to various analysis algorithms and learn to compare different standard approaches to the same task. The book includes a review of the fundamentals of audio signal processing, psychoacoustics, and music theory. An invaluable guide for newcomers to audio signal processing and industry experts alike, An Introduction to Audio Content Analysis also features downloadable MATLAB files from a companion website, [www.AudioContentAnalysis.org](http://www.AudioContentAnalysis.org), lists of abbreviations and symbols, and references.

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