

1. Record Nr.	UNINA9910143748903321
Autore	Larsen Erik R. <1975->
Titolo	Audio bandwidth extension : application of psychoacoustics, signal processing and loudspeaker design // Erik Larsen, Ronald M. Aarts
Pubbl/distr/stampa	Chichester, : John Wiley & Sons, c2004
ISBN	9786610541621 9781280541629 1280541628 9780470858714 0470858710 9780470858653 0470858656
Descrizione fisica	1 online resource (313 p.)
Altri autori (Persone)	AartsRonald M
Disciplina	621.3822
Soggetti	Psychoacoustics Signal processing Acoustical engineering Radio frequency Loudspeakers - Design and construction
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references (p. [269]-284) and index.
Nota di contenuto	Audio Bandwidth Extension; Contents; Preface; I Introduction; I.1 Bandwidth Defined; I.2 Historic Overview; I.2.1 Electroacoustic Transducers; I.2.2 Sound Quality; I.3 Bandwidth Extension Framework; I.3.1 Introduction; I.3.2 The Framework; 1 From Physics to Psychophysics; 1.1 Signal Theory; 1.1.1 Linear and Non-linear Systems; 1.1.2 Continuous-time LTI (LTC) Systems; 1.1.3 Discrete-time LTI (LTD) Systems; 1.1.4 Other Properties of LTI Systems; 1.1.5 Digital Filters; 1.2 Statistics of Audio Signals; 1.2.1 Speech; 1.2.2 Music; 1.3 Loudspeakers; 1.3.1 Introduction to Acoustics 1.3.2 Loudspeakers 1.3.3 Bessel and Struve Functions; 1.4 Auditory Perception; 1.4.1 Physical Characteristics of the Peripheral Hearing System; 1.4.2 Non-linearity of the Basilar Membrane Response; 1.4.3

Frequency Selectivity and Auditory Filters; 1.4.4 Loudness and Masking; 1.4.5 Pitch; 1.4.6 Timbre; 1.4.7 Auditory Scene Analysis; 1.4.8 Perceptual Modelling - Auditory Image Model; 2 Psychoacoustic Bandwidth Extension for Low Frequencies; 2.1 Introduction; 2.2 Psychoacoustic Effects for Low-frequency Enhancement of Small Loudspeaker Reproduction; 2.2.1 Pitch (Harmonic Structure) 2.2.2 Timbre (Spectral Envelope) 2.2.3 Loudness (Amplitude) and Tone Duration; 2.3 Low-Frequency Psychoacoustic Bandwidth Extension Algorithms; 2.3.1 Overview; 2.3.2 Non-Linear Device; 2.3.3 Filtering; 2.3.4 Gain of Harmonics Signal; 2.4 Low-Frequency Psychoacoustic Bandwidth Extension with Frequency Tracking; 2.4.1 Non-Linear Device; 2.4.2 Frequency Tracking; 2.5 Subjective Performance of Low-Frequency Psychoacoustic Bandwidth Extension Algorithms; 2.5.1 'Virtual Bass'; 2.5.2 'Ultra Bass'; 2.6 Spectral Characteristics of Non-Linear Devices; 2.6.1 Output Spectrum of a Rectifier 2.6.2 Output Spectrum of Integrator 2.6.3 Output Spectra in Discrete Time; 2.6.4 Output Spectrum of Clipper; 3 Low-frequency Physical Bandwidth Extension; 3.1 Introduction; 3.2 Perceptual Considerations; 3.2.1 Pitch (Spectral Fine Structure); 3.2.2 Timbre (Spectral Envelope); 3.2.3 Loudness (Amplitude); 3.3 Low-frequency Physical Bandwidth Extension Algorithms; 3.3.1 Systems with Low-frequency Extension; 3.3.2 Non-linear Device; 3.3.3 Filtering; 3.3.4 Gain of Harmonics Signal; 3.4 Low-frequency Physical Bandwidth Extension Combined with Low-frequency Psychoacoustic Bandwidth Extension

4 Special Loudspeaker Drivers for Low-frequency Bandwidth Extension 4.1 The Force Factor; 4.2 High Force Factor Drivers; 4.3 Low Force Factor Drivers; 4.3.1 Optimal Force Factor; 4.4 Transient Response; 4.4.1 Gated Sinusoid Response; 4.4.2 Impulse Response; 4.5 Details of Lumped-element Parameters and Efficiency; 4.6 Discussion;

5 High-frequency Bandwidth Extension for Audio; 5.1 Introduction; 5.2 The Limits of Deconvolution; 5.3 Perceptual Considerations; 5.3.1 Pitch (Harmonic Structure); 5.3.2 Timbre (Spectral Envelope); 5.3.3 Loudness (Amplitude); 5.3.4 Effects of Hearing Loss 5.3.5 Conclusions

---

## Sommario/riassunto

Bandwidth extension (BWE) refers to various methods that increase either the perceived or real frequency spectrum (bandwidth) of audio signals. Such frequency extension is desirable if at some point the frequency content of the audio signal has been reduced, as can happen for example during recording, transmission or reproduction. This volume, significant in dealing exclusively with BWE, discusses applications to music and speech and places particular emphasis on signal processing techniques. Presents an all-encompassing approach to BWE by covering theory, applications and algorithms<

---