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| Nota di contenuto | Advanced Digital Signal Processing and Noise Reduction; Contents; Preface; Acknowledgements; Symbols; Abbreviations; 1 Introduction; 1.1 Signals, Noise and Information; 1.2 Signal Processing Methods; 1.2.1 Transform-Based Signal Processing; 1.2.2 Source-Filter Model-Based Signal Processing; 1.2.3 Bayesian Statistical Model-Based Signal Processing; 1.2.4 Neural Networks; 1.3 Applications of Digital Signal Processing; 1.3.1 Digital Watermarking; 1.3.2 Bio-medical, MIMO, Signal Processing; 1.3.3 Echo Cancellation; 1.3.4 Adaptive Noise Cancellation; 1.3.5 Adaptive Noise Reduction<br>1.3.6 Blind Channel Equalisation1.3.7 Signal Classification and Pattern Recognition; 1.3.8 Linear Prediction Modelling of Speech; 1.3.9 Digital Coding of Audio Signals; 1.3.10 Detection of Signals in Noise; 1.3.11 Directional Reception of Waves: Beam-forming; 1.3.12 Space-Time Signal Processing; 1.3.13 Dolby Noise Reduction; 1.3.14 Radar Signal Processing: Doppler Frequency Shift; 1.4 A Review of Sampling and Quantisation; 1.4.1 Advantages of Digital Format; 1.4.2 Digital Signals Stored and Transmitted in Analogue Format; 1.4.3 The Effect of |

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1.4.4 Sampling a Continuous-Time Signal1.4.5 Aliasing Distortion; 1.4.6 Nyquist Sampling Theorem; 1.4.7 Quantisation; 1.4.8 Non-Linear Quantisation, Companding; 1.5 Summary; Bibliography; 2 Noise and Distortion; 2.1 Introduction; 2.1.1 Different Classes of Noise Sources and Distortions; 2.1.2 Different Classes and Spectral/Temporal Shapes of Noise; 2.2 White Noise; 2.2.1 Band-Limited White Noise; 2.3 Coloured Noise;  Pink Noise and Brown Noise; 2.4 Impulsive and Click Noise; 2.5 Transient Noise Pulses; 2.6 Thermal Noise; 2.7 Shot Noise; 2.8 Flicker (I/f ) Noise; 2.9 Burst Noise

2.10 Electromagnetic (Radio) Noise2.10.1 Natural Sources of Radiation of Electromagnetic Noise; 2.10.2 Man-made Sources of Radiation of Electromagnetic Noise; 2.11 Channel Distortions; 2.12 Echo and Multi-path Reflections; 2.13 Modelling Noise; 2.13.1 Frequency Analysis and Characterisation of Noise; 2.13.2 Additive White Gaussian Noise Model (AWGN); 2.13.3 Hidden Markov Model and Gaussian Mixture Models for Noise; Bibliography; 3 Information Theory and Probability Models; 3.1 Introduction: Probability and Information Models; 3.2 Random Processes

3.2.1 Information-bearing Random Signals vs Deterministic Signals3. 2.2 Pseudo-Random Number Generators (PRNG); 3.2.3 Stochastic and Random Processes; 3.2.4 The Space of Variations of a Random Process; 3.3 Probability Models of Random Signals; 3.3.1 Probability as a Numerical Mapping of Belief; 3.3.2 The Choice of One and Zero as the Limits of Probability; 3.3.3 Discrete, Continuous and Finite-State Probability Models; 3.3.4 Random Variables and Random Processes; 3.3.5 Probability and Random Variables - The Space and Subspaces of a Variable

3.3.6 Probability Mass Function - Discrete Random Variables

Sommario/riassunto

Digital signal processing plays a central role in the development of modern communication and information processing systems. The theory and application of signal processing is concerned with the identification, modelling and utilisation of patterns and structures in a signal process. The observation signals are often distorted, incomplete and noisy and therefore noise reduction, the removal of channel distortion, and replacement of lost samples are important parts of a signal processing system.  The fourth edition of Advanced Digital Signal Processing and Noise Reduction updates an