pynoise Documentation

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CHAPTER

ONE

INTRODUCTION

This package was created to add noise to signals, which can be matrices or vectors. As of October 2018, only the additive white gaussian noise is implemented.

1.1 Additive White Gaussian Noise

Additive White Gaussian Noise (AWGN) is a signal generated from a normal distribution. Due to this characteristic, the noise energy is spread across all spectrum.

CHAPTER

TWO

PYNOISE PACKAGE

2.1 Submodules

2.2 pynoise.noise module

This module contains functions to work with signals and noise.

pynoise.noise.**awgn**(*x*, *snr*, *out='signal'*)

Adds White Gaussian Noise to a signal.

The noise level is specified as a Signal-to-Noise Ratio (SNR) value. The SNR is defined as:

$$SNR = 10 \log_{10} \left(\frac{E_x}{E_n} \right)$$

where E_x is the signal power and E_n is the noise power. The noise of a discrete signal can be computed as:

$$E = \frac{1}{N} \sum_{k=0}^{N-1} |x_k|^2$$

Parameters

- **x** (np.ndarray) – Signal.
- **snr** (*int, float*) – Signal-to-Noise ration.
- **out** (*str, optional*) – Output data. If 'signal', the signal *x* plus noise is returned. If 'noise', only the noise vector is returned. If 'both', signal with noise and noise only are returned. Any other value defaults to 'signal'.

Returns Corrupted signal.

Return type np.ndarray

2.3 Module contents

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