Assignment 1

The due date for submitting this assignment is Friday, 2018-09-11, 23:59 IST.

1. Determine the prior to transmit over the channel, the bits are
   - Encoder
   - Decoder
   - Modulated
   - Demodulated
   - Received
   - Sent
   - Error
   - No error
   - Encoder
   - Decoder
   - Modulated
   - Demodulated

2. The spatial content of a random signal is encoded using
   - Fast Fourier Transform
   - Power Spectral Density
   - Fourier Transforms
   - Discrete Time Fourier Transforms
   - No, the prior is incorrect.
   - Corrected

3. Write a note to characterize by
   - Gaussian probability density function
   - Power Spectral Density
   - Fourier Transforms
   - Discrete Time Fourier Transforms
   - Autocorrelation
   - No, the prior is incorrect.
   - Corrected

4. Which of the following is true?
   - A white noise stationary random process is also non-white stationary
   - A white noise stationary random process is not necessarily non-white stationary
   - A white noise stationary random process is also non-white stationary
   - A white noise stationary random process is also non-white stationary
   - Encoder
   - Decoder
   - Modulated
   - Demodulated

5. Instantaneous error reception over the channel; the symbols are
   - Encoder
   - Decoder
   - Modulated
   - Demodulated
   - No, the prior is incorrect.
   - Corrected

6. The power spectral density of a random process is obtained as
   - Fast Fourier Transform of the random process
   - Fourier Transform of the autocorrelation function
   - Divide the Fourier transform by its spread in frequency
   - Fourier transform of the probability density function of the random process
   - No, the prior is incorrect.
   - Corrected

7. Consider the transmission of the real random process $x(t)$ through the LTI system with real impulse response $h(t)$. Let $d(t)$ denote the autocorrelation and $d(t)$ denotes periodic. The power spectral density $S_{xx}(f)$ of the Fourier transform of $x(t)$ is

\[
S_{xx}(f) = \text{spectrum of } x(t)
\]

8. Consider the white Gaussian noise with zero mean and autocorrelation $\mathcal{R} (\cdot)$, it is passed through an LTI system. The power spectral density is $S_{x}(f)$, $x(t)$. What is the output of the system with input $x(t)$?

9. Consider a signal which is a white Gaussian noise with zero mean and autocorrelation $\mathcal{R}(\cdot)$. It is passed through an LTI system. What is the output of this system?

10. Consider a signal which is a white Gaussian noise with zero mean and autocorrelation $\mathcal{R}(\cdot)$. It is passed through an LTI system. What is the output of this system?