Stony Brook University

Assignment 5A
Random Processes

1   Assignment

1. (a) Sketch the ensemble of the random process

$$X(t) = \boldsymbol{A}cos(2\pi f_0 t + \theta),$$

where $\boldsymbol{A}$ is a uniform random variable $\mathcal{U}(-5, 5)$, and $f_0 = 100$ and $\theta = 0$ are constants.

   (b) Choose two different time instants, for example, where $(2\pi f_0 t + \theta) = \pi$ and where $(2\pi f_0 t + \theta) = 1.5\pi$. Call these time instants t_1 and t_2. Plot a histogram of $X(t_1)$ and $X(t_2)$, by observing the realizations at these time instants.

2. Repeat problem [1] with A and f are constants, and $\boldsymbol{\theta}$ a uniform random variable $\mathcal{U}(0, 2\pi)$:

$$X(t) = Acos(2\pi f t + \boldsymbol{\theta}).$$