ECE 485 Feb 12, 2020 Ashlynn Steeves

Assignment 1 V00850631

1a. See Attached Graph

1b. See Attached Graph

There is no decision boundary that satisfies the conditions of 1bii

1c. D_KL[pw1(x), pw2(x)] = 0.419

D_KL[pw2(x), pw1(x)] = 0.0105

2a. Information of △ = 1.78

Information of “orange” = 2

2b. Ha = 1.75

Hb = 2.37

2c. The maximum entropy, which would occur when all of the events are equally likely, are Ha_max = 2 and Hb_max = 2.585. Since Ha_max > Ha and Hb_max > Hb neither Pa(.) nor Pb(.) are maximum entropy distributions.

2d. P = 6.5104e-04

2e. P = 0.0052

3a. Under these circumstances the system is non-ergodic. This is due to the fact that A is a random variable, therefore for every repetition of the experiment the amplitude may vary.

3b. X(t) is not stationary in any case as its statistics are time dependent due to the time dependent exponential term.

3c. X(t) is neither quasi-stationary nor quasi-ergodic as there are no known models that can be used to transform this system into a stationary system or an ergodic system.

3d. Under these circumstances the system would be mean-ergodic since its initial conditions are stable and its mean is independent of time.

3e. X(t) is not wide sense stationary as its statistics (specifically mean and standard deviation) are time dependent due to the time dependent exponential term.

3f. No, this will not be a random process as we know the outcome of the system at every point.