Stochastics Quiz #5

Detection Theory

Name:

A random variable R is observed, and it is known that under H0:

And under H1

Furthermore, assume *p*0 = 1/3 and *p*1 = 2/3

1. Plot the class conditional pdf’s on one axis. Be sure to label.
2. Consider a decision rule: If |r| > γ decide H0 else decide H1. Determine the probability of error for this rule if γ = ½
3. Determine the likelihood ratio test and find a decision rule that minimizes the overall probability of error.
4. Now suppose *p*0 and *p*1 are no longer constrained, but cannot be either 0 or 1. Find which values of *p*0  such that the decision rule that minimizes the probability of error always decides the same hypothesis, regardless of the observation.