

Stat 8003, HW2

Due: Thursday, Sep 11th, 2014

1. Suppose that X is a discrete random variable with $P(X = 0) = 0.25$, $P(X = 1) = 0.125$, $P(X = 2) = 0.125$, and $P(X = 3) = 0.5$. Calculate the cdf of X and graph the cdf using R.
2. A certain type of cancer is known to in 2 percent of the population of the males in their fifties. A test for the disease is advertised by a pharmaceutical company to have %3 of false negative and %1 of false positive.
 1. Compute the probability that you have cancer if you are tested positive.
 2. To make sure that you really have cancer and an invasive and expensive surgery is needed. Your health insurance company is not willing to pay for this unless the pharmaceutical company improves its test in such way that that at least %90 of people who are tested positive actually have the disease. How low should be the rate of false positive for the test to reach this goal? (Assume that the rate of false negative remains the same).
3. Suppose there is a continuous random variable X with cdf $F(x)$. Let $Y = F(X)$. What is the distribution of Y ?
4. Generate 10,000 random samples from a distribution with the pdf $f(x) = 3x^21(0 < x < 1)$. State your steps and program it in R. After generating these random numbers, plot its density and compare it with the actual pdf function. (Hint: Use the result from Problem 4.)