

Statistical Simulation

Homework 2

Due data: 00:00, October 31, 2019

1. Use the inverse transform method and the rejection method for generating a random variable having density function (pdf)

$$f(x) = \frac{e^x}{e-1}, \quad 0 < x < 1.$$

Draw the histogram of your samples and add its true density function on the histogram.

2. Give an algorithm for generating a random variable having density function (pdf)

$$f(x) = \begin{cases} e^{2x} & -\infty < x < 0 \\ e^{-2x} & 0 < x < \infty. \end{cases}$$

Draw the histogram of your samples and add its true density function on the histogram.

3. Use the rejection method to find an efficient way to generate a random variable having density function

$$f(x) = \frac{1}{2}(1+x)e^{-x}, \quad 0 < x < \infty.$$

What is the value of c in the rejection method? Draw the histogram of your samples and add its true density function on the histogram. **Hint: Let $g(x)$ is the pdf of exponential distribution.**

4. Use the composite method to generate a random variable having distribution function

$$F(x) = \frac{x + x^3 + x^5}{3}, \quad 0 \leq x \leq 1.$$

Draw the histogram of your samples and add its true density function on the histogram.