Monte Carlo Methods Spring 2025
Homework 03 - Pseudo Random Number Generators

Due: Tuesday, Feb 11, 2024, 11:59 PM

1. (15 points) The triangular distribution supported on $[a, b]$ has the pdf whose graph is shown below.

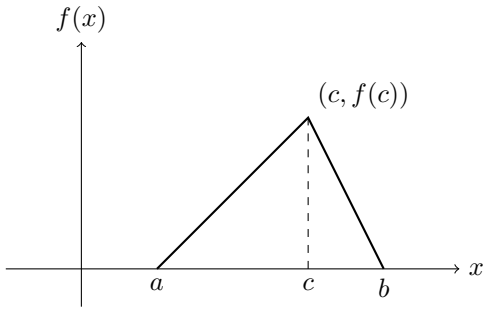

Figure 1: pdf of triangular distribution

Note that c is the mode of the distribution.

   (a) Find the value of $f(c)$.

   (b) Find the pdf of the triangular distribution.

   (c) Find the cdf of the triangular distribution.

   (d) Find the inverse cdf of the triangular distribution.

2. The Weibull distribution has the pdf

$$f(x) = \begin{cases} \frac{k}{\lambda}\left(\frac{x}{\lambda}\right)^{k-1} e^{-(x/\lambda)^k} & x \geq 0 \\ 0 & x < 0 \end{cases} \tag{1}$$

   where $k > 0$ is the shape parameter and $\lambda > 0$ is the scale parameter.

   (a) Find the cdf of the Weibull distribution.

   (b) Find the inverse cdf of the Weibull distribution.

3. (30 points) Jupyter Notebook on Canvas.