

STAT 451: Computational Statistics (Spring 2020) Homework 2

Due date: February 7, 2020 (Friday), before class

- 1) Problem 6.3 on page 195, Parts (a) (c) (d).
(Note: Part (b) has been assigned as Problem 3 in Homework 1.)
- 2) Compare different envelope functions in importance sampling.

(a) Run the importance sampling code in

`6_4_1.R`

Fill in the rows in table below using the results.

Envelope	IS Estimate	Effective Sample Size	Standardized IS Estimate
abs(Normal(0,1))			
Unif(0,1000)			
abs(Cauchy(0,1))			

- (b) Add a column to your table for the estimate given by SIR (resample size of 1000). Also compute the standard Monte Carlo estimate of $E(\sqrt{x})$ with a sample size of 10000.
- (c) Add columns to your table and fill in the standard errors for: the IS estimate (equation 6.41), the standardized IS estimate (equation 6.43), the standard MC estimate, and the SIR estimate (s.e. taken to be the sample standard deviation of the final SIR sample, divided by $\sqrt{1000}$).
- (d) Discuss your findings in a-c.