AMS 553: Simulation Modeling and Analysis

Project Proposal

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1 Project Description

Importance sampling is an essential variance reduction technique in one of the Monte Carlo methods. The main idea behind importance sampling is that certain values of input random variables in a simulation are more important to the parameter being estimated than others. In some cases, it is very difficult to precisely estimate the probability of a rare event because the estimator's variance is too big. In general, in order to get a meaningful result, we increase the number of replications to reduce the variance of the estimator. Hence, a Crude Monte Carlo simulation generally requires a large number of replications. In this project, we will apply importance sampling techniques in simulation to estimate the probability of a rare event with a much smaller number of replications to achieve a higher statistical efficiency of simulation.

2 Workload Distribution

1. Kai Li will do a thorough research on the existing importance sampling techniques.
2. Wenbo Du will prepare a project presentation.
3. Zhe Zhou will write a proposal and provide relevant code to implement the given method.
4. Zeyu Dong will write a final report of the project.