

Assignment 3

In this assignment, we are going to use Monte Carlo simulation to estimate the characteristics of a stochastic system. For Monte Carlo simulation, use $n \geq 5000$.

In system 1, it is desired to send a signal from A to B . Each of the five components is subject to random failures, and the components fail independently of each other. Let Y be the time to failure of the entire system and let X_i be the time to failure of component, i , for $i = 1, 2, \dots, 5$. We assume that X_i is exponentially distributed with mean β_i days, with the mean β_i 's given in table below,

i	β_i (in days)
1	10
2	8
3	7
4	5
5	6

Find an estimate of the expected time to failure of system 1. Also, find an estimate of the probability that system 1 will function for at least seven days, and draw a histogram of the data of time to failure of system 1.

In system 2, it is desired to send a signal from 1 to 2. Each of the six components is subject to random failures, and the components fail independently of each other. Let Y be the time to failure of the entire system and let X_i be the time to failure of component, i , for $i = 1, 2, \dots, 6$. We assume that X_i is exponentially distributed with mean β_i days, with the mean β_i 's given in table below,

i	β_i (in days)
A	10
B	8
C	7
D	6
E	5
F	4

Find an estimate of the expected time to failure of system 2. Also, find an estimate of the probability that system 2 will function for at least seven days, and draw a histogram of the data of time to failure of system 2.

