

Quiz #12

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Simulations

Problem 1.

Consider the following two-step experiment. First you draw a simulated value from a Bernoulli($p=1/3$). If the drawn value from the Bernoulli equals 0, then you draw a simulated value from $Gamma(\alpha = 2, \theta = 5)$. On the other hand, if the drawn value from the Bernoulli equals 1, then you draw a simulated value from $Gamma(\alpha = 10, \theta = 20)$

(10 points) Repeat the above two-step experiment 10000 times and draw the histogram of the simulated values.

(2 points) Find the theoretical mean of the above distribution and compare it to the mean of the simulated values.

(3 points) Find the theoretical probability that the above random variable exceeds 100. It's acceptable to use the `pgamma` command. Compare it to the proportion of the simulated values exceeding 100.