

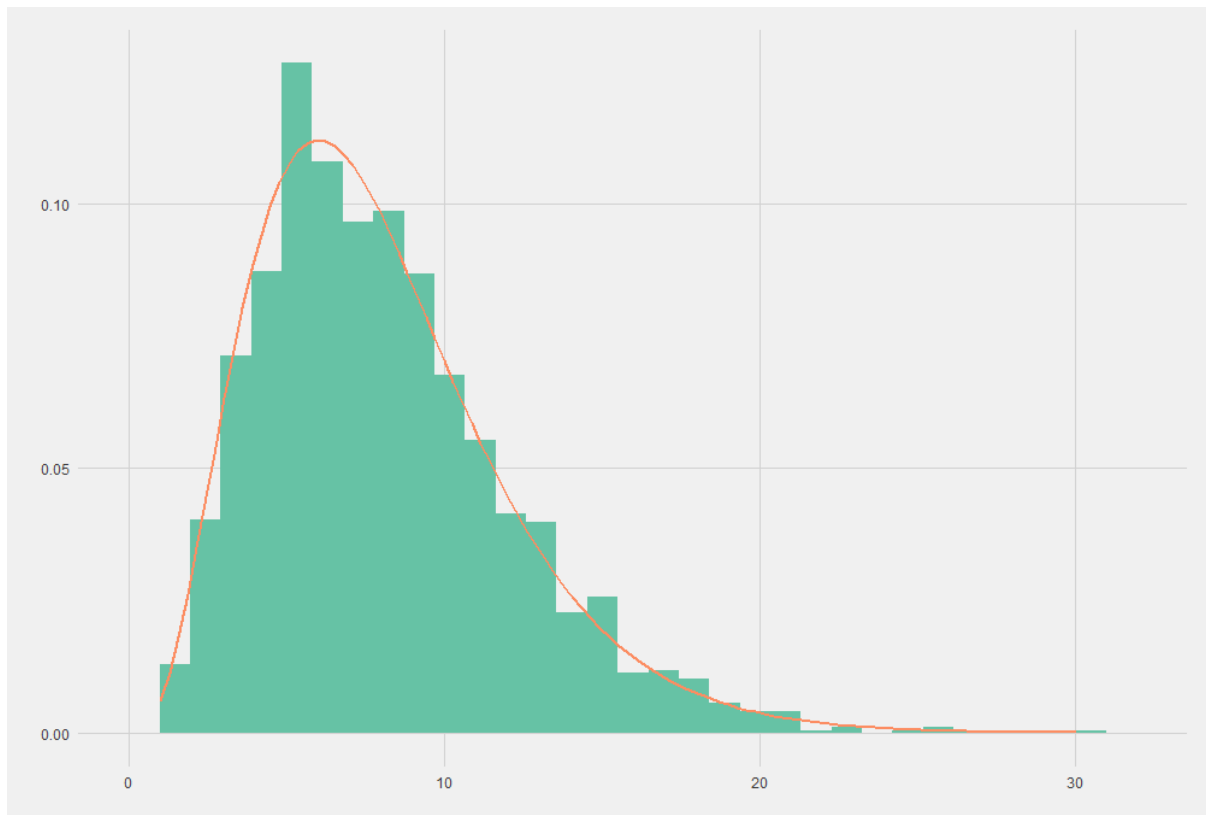
Monte Carlo Inference - Lab 2

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This lab details methods of simulating distributions using the method of inversion and rejection sampling.

Inversion Method

The first histogram is an approximation of the gamma distribution by distribution taking 2000 samples random uniform samples and inputting them to the inverted gamma distribution.



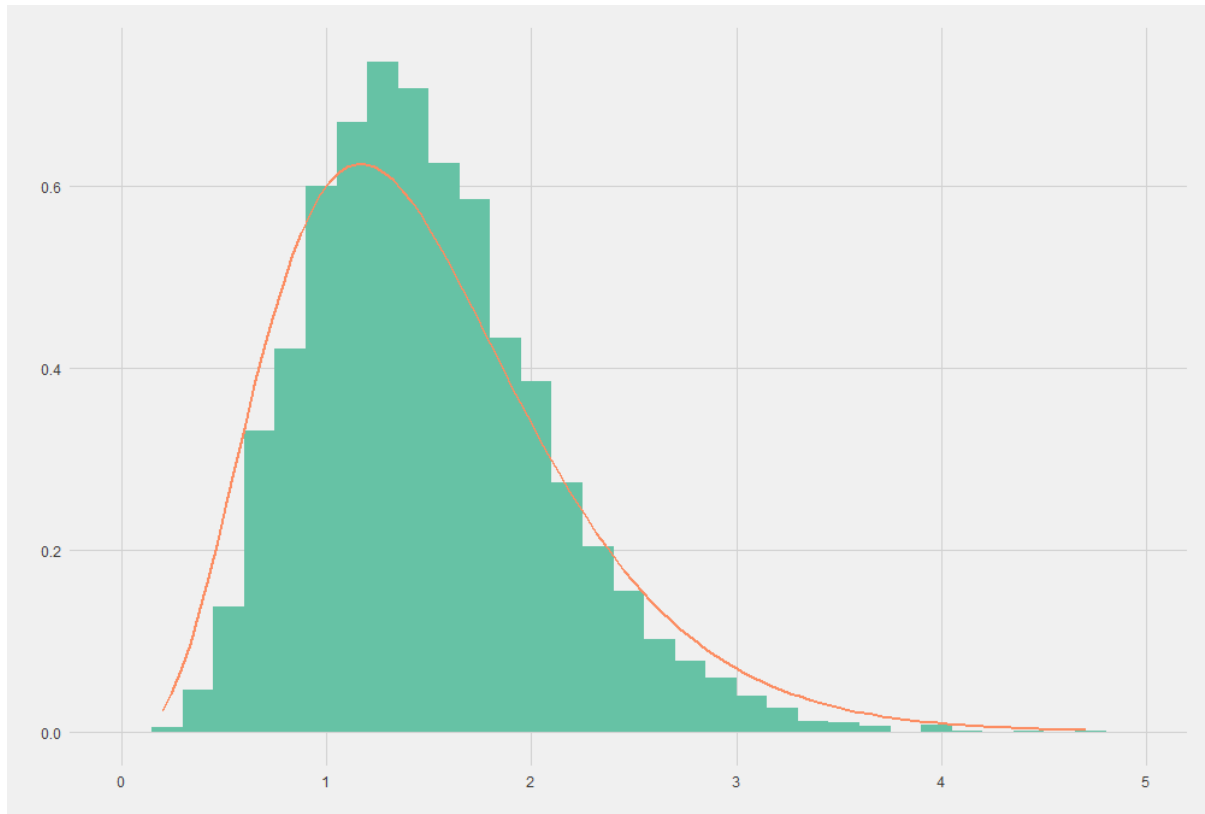
The orange line is the plot of a gamma distribution with a shape of 4 and rate of 0.5. As we can see, the sampled distribution is well approximated using the inversion method.

The Kolmogorov-Smirnov test outputs:

D = 0.021824, p-value = 0.2966
alternative hypothesis: two-sided

Rejection Sampling

Below is the plot of a sample gamma distribution with shape = 4.5, rate = 3. We use rejection sampling with a known distribution - gamma with shape = 4.5, rate = 3.



The sample approximates the target distribution well. The Kolmogorov-Smirnov test outputs:

$D = 0.064943$, $p\text{-value} < 2.2e-16$
alternative hypothesis: two-sided

The proportion of accepted samples and rejected samples should converge to M , the proportion of the target distribution and the known distribution.