

Quiz #9: Solutions

Milica Cudina

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Create an R-notebook which prints out the answers to the following problems. Knit the Rmd file into a pdf. Upload the pdf of your solutions onto Canvas. All of your work and calculations **must** be done in R.

Problem 1.

The goal of this exercise is to simulate 10,000 values from the Pareto distribution using the inverse transform method. Then, you are going to draw a histogram of the simulated values. Finally, you are going to superimpose the graph of the exponential density on top of the histogram.

(4 points) Define the function `pareto.inv.cdf` to be the inverse of the cumulative distribution function of the Pareto distribution.

```
pareto.inv.cdf<-function(x, theta, alpha){  
  theta*((1-x)^(-1/alpha)-1)  
}
```

(1 point) Set the value of the variable `nsim` to be the required number of simulated draws stipulated in the problem statement above.

```
nsim=10000
```

(1 point) Set particular values of a variables `theta` and `alpha` to be the parameters of the two-parameter Pareto distribution you want to simulate from. The values of the parameters you settle upon are completely up to you.

```
theta=100*pi  
theta  
## [1] 314.1593  
alpha=exp(2)  
alpha  
## [1] 7.389056
```

(2 points) Create the vector `u.s` of `nsim` simulated values from the unit uniform distribution.

```
u.s<-runif(nsim)
```

(4 points) Set the vector `sims` to contain the `nsim` simulated values from the two-parameter Pareto distribution with the parameters `theta` and `alpha` you defined above. Do **not** print out the simulated values.

```
sims=pareto.inv.cdf(u.s, theta, alpha)
```

(3 points) Using the command `hist`, plot the histogram of the simulated values. Note that you can alter bin sizes by using `breaks` in the `hist` inputs.

```
hist(sims, breaks=50, col="lavender",  
     main="Pareto simulations")
```

