Week 4 Assignment

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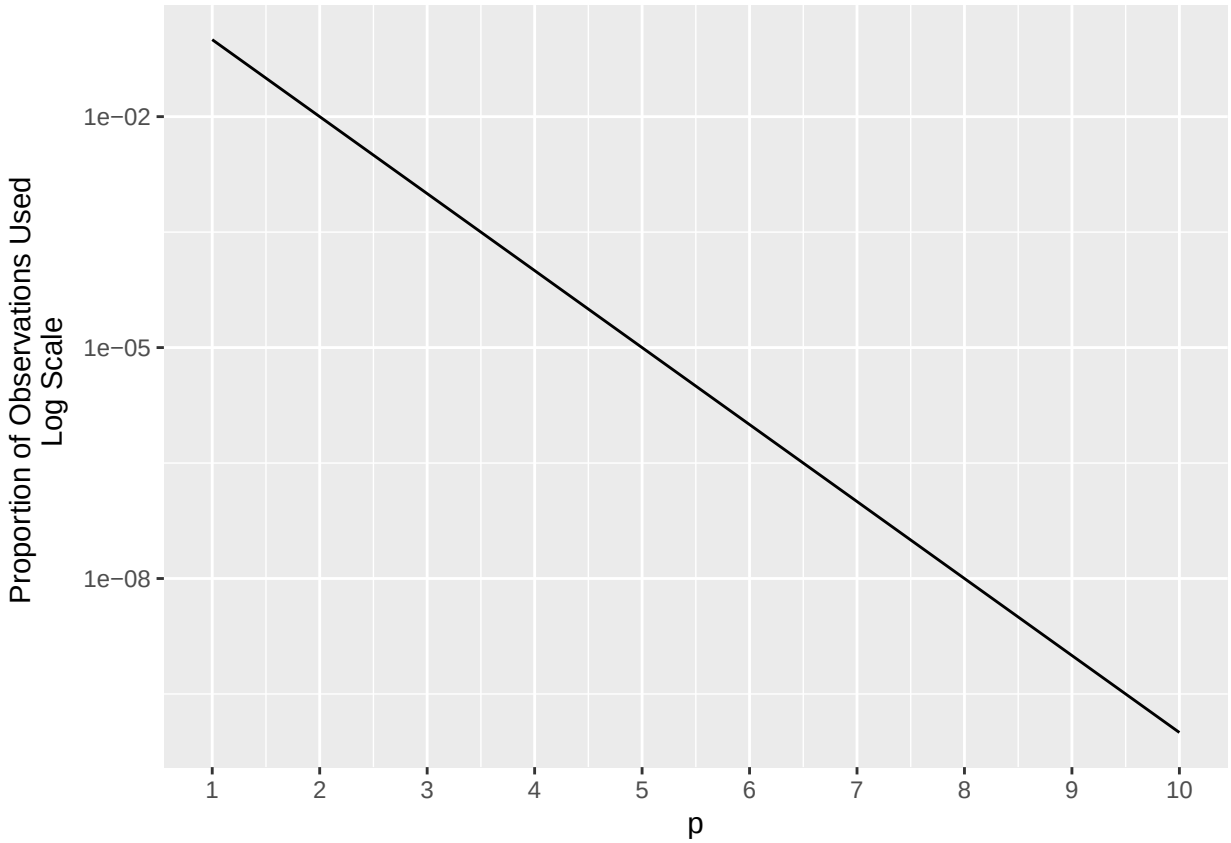
- 4.7 #4
- a. In this scenario, 10% of the observations will be used to make a prediction.
- b. In this scenario, 1% of the observations will be used to make a prediction.
- c. In this scenario, 10^{-100} of the observations will be used to make a prediction.
- d. Consider a scenario where there are n = 1000 observations. If p = 1, we will utilize 100 observations per prediction on average. If p = 2, we will use 10 observations per prediction on average. If p = 100, we will use approximately 0 observations per prediction on average. In order to use even 10 observations on average, we would need n = $10^2$1 observations when p = 100. The plot below demonstrates the percentage of observations used as a function of p (note that the y-axis is on a log scale).



- e. When p = 1, the hypercube (in this case, a 1D line) will have length 0.10. When p = 2, the hypercube (in this case, a 2D square) will have length $\sqrt{0.10} = 0.316$. When p = 100, the hypercube (in this case, a 100D cube) will have length $0.10^{1/100} = 0.977$. In general, for a given p, the hypercube will require a length of $0.10^{1/p}$. For an arbitrary percentage of the training observations t for a hypercube of dimension p, the hypercube will need to be of length $t^{1/p}$.