Stat 471: Homework 06

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Due Date: December 8, 1:20pm. No late assignments will be accepted or graded. There will be 10% bonus points for exceptional solutions.

1. Using `strength.data`, fit model

   $$\texttt{grip} = \texttt{g}(\texttt{arm}) + \epsilon$$

   using Gaussian kernel smoothing. Choose your bandwidth σ^2 by mimimizing leave–one-out cross-validation criterion.

2. (Problem due to M. Newton) There is an investigator at NIH who may be interested.to compute the probability distribution of

   $$R_{2k} = \frac{X_{(2k)}}{X_{(k)}}$$

   where $X_{(k)} = \max(X_1, ..., X_k)$ is an order statistic of $X_i \sim \text{Gamma}(\alpha, \beta)$ He is curious to know how sensitive the distribution is to the baseline distribution of the X_i's. Make a `MATLAB` function that takes α, β, k as input variables and generate the kernel density estimate `fhat` (see lecture 31 `MATLAB` output). Plot $\hat{f}$ for various α and β. How sensitivy $\hat{f}$ is when you change α and β? You may assume k to be very large, i,e. $k = 100$ and use the built-in Gamma random number generator.