Homework problem 10

Degrees of freedom of Nearest Neighbors

Prove that the optimism of k-NN with n observations is $2n/k\sigma^2$.

Degrees of freedom of averaging

Prove in two ways that optimism of the simple model which fits the average of the training data $\hat{Y} = \bar{Y}$ is $2/n\sigma^2$:

- Once using the definition of optimism and calculating the covariance

- Once using the result on least squares we proved in class, and the fact that the average can be described as least squares fit on a constant predictor