Econ 573: Problem Set 5

Due date: 11/8

Fall 2022

The problem set is due **before** the class, 12:30 PM. Instructions: give a justification to all of your answers. Make sure to submit all the relevant files. For the empirical exercise you can find the data following this link:
https://www.statlearning.com/resources-second-edition.

Part I

Ex 3, 10 from Chapter 12 of ISL.

Part II

- What are the latent factors (Principal Components) of international currency pricing? And how do these factor move against US equities?
- We're going to investigate underlying factors in currency exchange rates and regress the S&P 500 onto this information.
- FX data is in FXmonthly.csv. SP500 returns are in sp500csv. Currency codes can be found at, https://fred.stlouisfed.org/series/EXCHUS.
- Translate the prices to "returns" via
  fx $<-$ read.csv("FXmonthly.csv")
  fx $<-$ (fx[2:120,]-fx[1:119,])/(fx[1:119,])

1. Discuss correlation amongst variables of fx. How does this relate to the applicability of PCA?
2. Fit, plot, and interpret principal components (PCs).
3. Regress SP500 returns onto currency movement PCs, using both "glm on first K" and lasso techniques. Use the results to add to your factor interpretation.
4. Fit lasso to the original covariates and describe how it differs from the principal components regression here.

5. Bonus: Fit PLS and compare to PCA.