

MATH 133 PROBLEM SET 7

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ABSTRACT. Due Wednesday, April 26

Question 1. Find the daily closing prices of the Standard and Poor's 500 index ($\hat{S}PX$) on finance.yahoo.com for the last 50 years. Compute the natural logarithms of the prices, and fit the resulting numbers to a linear model (as a function of time in trading days). What is the slope? What is the correlation coefficient?

Question 2. Same as Question 1, but for the Dow Jones Industrial Average ($\hat{D}JI$).

Question 3. The *log-return* of a security for a day is the logarithm of the ratio of the closing price on that day to the closing price on the preceding day. Suppose your inputs are the daily log-returns of $\hat{S}PX$, and the outputs the daily log-returns of $\hat{D}JI$ (both over 50 years) on the same day. Calculate a linear fit of the inputs to the outputs. What is the correlation?

Question 4 – Bonus. Conduct a study of how stable your results to Questions 1-3 are over time (that is, look at the graphs and see whether different years, or decades, or?! have the same statistical behavior.

Key words and phrases. discrete, mathematics, sets, logic, combinatorics, graphs.