

Instructions: This is a graded course wide homework to be worked in groups. Any assistance you receive will be documented in accordance with (IAW) the DOWW. Your submission will have a cover sheet IAW the DOWW. This assignment is due **in class on 17 Oct 08**. If it is late, there is an automatic 10% reduction in grade and an additional 10% every 24 hours. All homework will be completed using a word processor (typed). If you use MS Word, then all formulas will be typed using equation editor. There is no need to print this assignment in color (black and white is fine), but make sure any graphs are readable.

Part I: Data fitting

Find a data set with one independent and one dependent variable that has more than 15 data points, does not appear on the MA 103 website, and has not been used in your class. You must document the source of this data set. Use this data to complete the following requirements:

1. What does the data set represent?
2. Plot the data using the software package of your choice.
3. Based on the trend of the data, choose **two different** and appropriate models to analyze the data set.
 - (a) List at least two valid and necessary assumptions.
 - (b) Explain why you chose each of these models.
 - (c) Manually estimate all your parameters and explain each estimation.
 - (d) Refine both models to determine the parameter values that make each model best fit the data.
4. Evaluate the two models using one subjective and one objective evaluation to determine which model represents the data set best. Explain your analysis and decision.
5. Using the best fit model, predict and explain a reasonable value.
 - (a) Explain what that value tells you about the situation.
 - (b) Do you think this is a good predictor? Why or why not? If not, what can you do to make your prediction better?

Part II: Discrete Dynamical Systems

Your cow loan may be two years away, but you are already thinking of that dream car you are going to purchase. Suppose last year's cow class had three interest options for borrowing:

BLACK: 0.0% compounded monthly for 36 months
 GREY: 0.3% compounded monthly for 48 months
 GOLD: 0.5% compounded monthly for 60 months

1. Research a car of your choice online that does not cost more than \$30,000. Describe the car you want and the price.
2. Create a difference or recursion equation which describes the payment method for the Black and Gold loan options.
3. For the Black and Gold loan options, compute the total interest paid for the loan. Assume you must finance the entire purchase price of the car you decide to buy. Also, assume you will not pay the loan off early. Show all work.
4. Suppose that this year's firsties could select from three different amounts.

BLACK: \$22,500 @ 0.0% compounded monthly for 36 months
 GREY: \$27,500 @ 0.3% compounded monthly for 48 months
 GOLD: \$32,500 @ 0.5% compounded monthly for 60 months

Suppose you borrow the entire \$32,500 to buy your car and choose to invest the remainder of your loan in a S&P 500 Fund. The S&P 500 Fund has paid an annualized return of 10.52% since 1994 until the end of fiscal year 2007, when dividends were reinvested.¹

- (a) At the conclusion of the Gold loan, how much profit have you made?
- (b) If you keep the S&P 500 Fund until you are 65 years old, how much money will you have?
- (c) Suppose you decide to buy an older model, which is \$5,000 less than your car from number 1. Compute the balance in your S&P 500 Fund under these terms when you turn 65.

¹S&P 500 Fund information. Downloaded from the World Wide Web on September 16, 2008, at www2.standardandpoors.com/spf/xls/index/MONTHLY.xls