Homework 1

CSE3102: Applied Probability for Computer Science

Due date: 2019/10/10

A. Background

> The increase in annual world crude oil production from 1880 to 1973 follows a pattern of exponential growth. In order to fit a linear model to these data, the oil production variable must be transformed by taking the natural log. A scatterplot of the log of oil production vs. year follows a straight line from 1880 to 1973. Political turmoil in the oil-producing regions of the mideast affected patterns of oil production after 1973.

- Methods: Scatterplot , Time series , Transformation
- Data file: "OilProduction.txt" from the e-class
- Output: Scatterplot of oil production vs. year

B. Problems

1. Draw graphs using GNU plot. (30pts)

a. Download "OilProduction.txt" available on the e-class

b. Comment out unnecessary parts (Note: Do not delete) and insert any comments if needed

d. Draw graphs with the outputs in Line, Point (scatterplot), line+point, dots, Boxes, Impulses)

2. Data transform (50pts)

a. In order to understand the data better, write a code to transform the data as the way you need (possibly exponential transform with your estimated parameter) using a programming language (C/C++, JAVA, Matlab, etc.) at your convenience.

b. Draw a scatterplot graph of the transformed data using GNU plot

c. Prove the statement "pattern of exponential growth" in the problem

3. Provide your own analysis about the oil production. (20pts)

> What to submit: A report with (1) the answers from the problems and (2) the source code from the problem 2.