MAT013 - Practice Sheet

Chapter 3

Attempt to do the following in SAS and/or R.

1. Download the data sets weight.xls and height.xls:
    1. Create a SAS data set containing the bmi of the observations.
    2. Output the data set to csv.
2. For the concatenated data set (of JJJ and MMM):
    1. For individuals over the age of 25, calculate the yearly average savings (for each year after their 25th birthday)
    2. Output a frequency table showing the mean yearly average by sex.
    3. Obtain the mean yearly average savings by sex and age groups:
        - Group A [0,18]
        - Group B [19,65]
        - Group C [66,]
    4. Find the mean, max and min for the variable "random number" and output this to a SAS data set.
3. Create (seperate) data sets containing the following:
    1. The first 200 odd numbers;
    2. The square root of the first 1000 integers;
    3. The square root of the first 10000 integers, selecting only those that are integers
    4. The first 20 prime numbers (this is slightly harder)
4. Download the file coordinates.csv.
    1. Obtain coefficients for a line fitted to the coordinates (x, y) of this data set.
    2. For each of the observations create a new variable giving the following:
        1. The product xy;
        2. The ration x/y;
        3. The exponent x^y;
        4. The sum $x + y$;
        5. The difference $x - y$;
        6. The absolute value of x;
        7. The square root of x;
        8. The log to the base 10 $\log_{10}(x)$;
        9. The natural log $\ln(x)$.
    3. Obtain the following for the above data set (including the newly created variables):
        1. minimum
        2. maximum
        3. total
        4. mean
        5. median
5. The probability that an $M/M/k$ queue is empty is given by the following formulae:

$$\pi_0 = \frac{1}{\sum_{i=0}^{k-1} \frac{(\lambda/\mu)^i}{i!} + \frac{(\lambda/\mu)^k}{k!(1-\lambda/(k\mu))}}$$

Obtain π_0 for $\lambda \in \{.1, .5, .7, .9\}$, $k = 3$ and $\mu = 1$.

6. Download the data set marks.csv

    1. Create a data set that shows the percentage increase or decrease of marks for each student from one month to the next.
    2. Obtain a table showing the mean of these percentage changes categorized by gender.

7. Download the data set numbers.csv and create the following variables:

    1. $y1 = x1 \times x2 \times \ldots x36$
    2. $y2 = (1 + z1/1) \times (1 + z2/2) \times \ldots (1 + z36/36)$
    3. $y3 = x1 - x2 + x3 - \cdots - x36$