MATH 189: Homework 1

Due Jan 20th 2023

The *Motor Trend Car Road Tests* dataset (mtcars.csv) contains the data extracted from the 1974 Motor Trend US magazine, and comprises fuel consumption and 10 aspects of automobile design and performance for 32 automobiles (1973–74 models). The dataset contains 32 observations on 11 variables. Analyze the dataset according to the following steps:

1. Calculate sample mean and sample variance of each variable.
2. Calculate the sample variance-covariance matrix and the sample correlation matrix. What can you say about the variance-covariance matrix and correlation matrix?
3. Draw a scatter plot between wt (Weight) and mpg (Miles per gallon).
4. Draw a scatter plot to show the relationship between wt (Weight), mpg (Miles per gallon) and cyl (Number of cylinders). You can use 3D scatter plot or add cyl to your 2D scatter plot as the color of points.
5. Draw pairwise scatter plot for all variables.
6. One engineer suggests that the relationship between wt and mpg is subject to the number of cylinders. According to the plot you draw in 4, what is your opinion towards this suggestion?