

MAT453 - ASSIGNMENT 3

Spring 2025

Assignment Due (by 11:59 P.M.): Friday, January 31

Directions: You may discuss the exercises with other students and with the instructor, but the work you turn in must be your own. You will need to submit your R code and answers to the questions below in **one** word or pdf file.

Data: The dataset *mtcars* is a built-in dataset in R. Run `data(mtcars)` in R to obtain the dataset.

Exercises: (10 points total) Answer the following questions:

1. Fit a full model to predict mpg (Y) from cyl (X_1), hp (X_2), drat (X_3), and wt (X_4) in R. Report your predictive model, SSE, SSR, and SSTotal.
2. With the help of R, calculate $\text{SSR}(X_3, X_4 | X_1, X_2)$ and partial R-square $R_{34|12}^2$.
3. Construct a partial F-test for the effects of drat (X_3) and wt (X_4): $H_0 : \beta_3 = \beta_4 = 0$. What is your conclusion?