

Consider the `Cars93` dataframe from `library(MASS)`. It is of interest to predict the city mileage of a car based on the following predictors

- $x_1$ : number of cylinders
- $x_2$ : engine size
- $x_3$ : horse power
- $x_4$ : RPM
- $x_5$ : number of passengers
- $x_6$ : weight

To make such a prediction, build a regression model as follows

1. Find correlation among all variables. Which predictors are more correlated?
2. Fit a full linear regression model. Verify regression assumptions and identify outliers.
3. Interpret the regression equation.
4. Interpret the model adequacy values (MSE,  $R^2$ )
5. Estimate the mean city mileage of a 4-cylinder car with 2.3 engine size, 5500 RPM, 2950 pounds, 4 passengers, and 200 horse power. Also construct a 90% confidence interval for that mean city mileage
6. Predict the city mileage of a 4-cylinder car with 3.1 engine size, 6000 RPM, 3150 pounds, 5 passengers, and 225 horse power. Also construct a 95% prediction interval for that price.