MATH 4773 Laboratory 7: Multiple Regression part 5

In this laboratory you will learn about interaction, interpretation of output and plotting.

# Objectives

In this lab you will learn how to make use of R’s formula language to make models and interpret output where interaction is present.

### Tasks

All output is to be made through RMD and finally knitted to an html document.

* Task 1
  + Download from CANVAS the zipped data files, “Dataxls”
  + Unzip the contents into a directory on your desktop (call it LAB)
  + Download the file “Lab7.R”
  + Place this file with the others in LAB7.
  + Start Rstudio
  + Open “lab7.r” from within Rstudio (this is an exemplar file).
  + Using hash commenting and at the top of Lab 7 place the task number eg #Task 1
  + Go to the “session” menu within Rstudio and “set working directory” to where the source files are located.
  + Create the working directory by issuing the command getwd(): under #Task 1
* Task 2
  + Make sure you install the readxl package if you haven’t already.
  + Read in the data PRODQUAL.xls
  + Answer Example 12.3 questions **using R** – see pg 657 by engaging with the data, R and the problem – or you will learn 0!!! Make sure that you make the very best graphical output possible.
    - A)
    - B)
    - C)
* Task 3
  + Read and understand pages 592 – 594 (sec 11.8) on interaction.
  + Reproduce Example 11.11 using R – read and understand the answers in the solution pg 593,4.
    - What is the NULL for the global F test?
    - Why is the alternate test in part b) one sided?
    - Derive the formula in part c) You MUST understand the interpretation!
* Task 4
  + Answer question 12.24 on page 660 using the WAFER2 data.
    - A)
    - B)
    - C)
    - D)
    - E)
* Task 5
  + Write a function mysecorder() that will take any xls data in the form of columns and perform a full MLR analysis, it needs to:
    - Take arguments filename, alpha
    - Produce a list containing
      * Summary y.lm info
      * Coefficients (point estimates)
      * ( ci for the (you can use ciReg() in s20x.
    - A graph of the estimated trend parabaloid using rgl – that is:
      * The graph should have the data plotted
      * And the parabaloid
      * All axes labelled
  + Now use your function on the WAFER2 data set and place all output here: