Exercise – Indicator Variable Regression

Answer the following questions with R code by creating (*and editing if you make a mistake*) an R script and iteratively running the code in RStudio.

Consider the following total catches (in 1000s) of Atlantic Cod (*Gadus morhua*) from Gulf of Maine by age group (2-11+) and capture year (1993-2004). Supposed that the fish are consistently recruited to the gear by age-4 and that consistent catches exist until age-8.

	Capture Year											
Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
2	127.8	54.0	277.0	90.0	85.4	107.5	22.1	201.1	147.2	3.0	16.4	0.9
3	2031.8	1488.2	1169.9	630.7	495.2	482.4	647.2	534.0	1183.5	259.5	118.6	357.8
4	783.0	1216.6	1192.0	1936.7	455.5	597.8	568.0	828.3	685.5	884.3	442.9	249.9
5	139.4	330.9	232.5	384.3	852.4	158.7	272.6	190.3	378.0	346.0	766.1	409.6
6	473.8	71.0	28.6	36.9	71.4	191.4	58.0	98.9	109.1	203.5	231.4	266.0
7	29.2	85.7	13.9	4.5	5.0	26.2	49.2	16.1	59.8	81.0	103.3	74.6
8	6.0	29.5	18.4	0.5	2.6	3.9	7.9	7.1	8.9	35.5	39.9	36.9
9	2.0	6.7	0.8	1.3	0.3	0.4	0.0	0.0	13.3	9.5	21.7	19.3
10	0.0	0.6	1.6	0.0	0.7	1.1	4.4	0.0	1.5	9.4	9.9	11.3
11+	0.0	1.2	0.2	0.0	0.1	0.4	0.0	0.0	0.5	0.6	7.4	3.5

1. Identify the earliest and latest year-classes fully represented in these data over the ages consistently fully-recruited and captured by the gear.

2. Enter the catch and age data for the two year-classes from the previous question and the two most intermediate year-classes into Excel in such a manner that you will be able to test if the instantaneous mortality rate differs between any pair of these year-classes. Save the data and load it into a data frame in R.

3. Statistically compare the instantaneous mortality rates between the earliest and latest year-classes. Which year-class, if either, has a higher mortality rate? By how much?

4. Load the **LakeTroutALTER.csv** file and determine if the length-weight regression is statistically different between male and female fish.

5. *If time permits ...* Statistically compare the instantaneous mortality rates between the two intermediate year-classes for the Atlantic Cod data. Which year-class, if either, has a higher mortality rate? By how much?