

Homework 9
MTH 3240, Spring 2020
Due Tue., May 5

Reading: *Environmental Statistics*:

- Chapter 12 (but Subsections **12.3.2-12.3.3** and Section **12.4** are **optional**)

Problems: Please do the following problems from the Problems sections of *Environmental Statistics*:

Chapter in <i>Environmental Statistics</i>	Problems
Ch. 12	12.1, 12.10*, 12.11*, 12.12**

* For **Problems 12.10** and **12.11, part a**, you can carry out the regression analysis using the `lm()` (“linear model”) function in R. First, use

```
> read.table(file.choose(), header = TRUE)
```

to read the data from the text file **Ch12Pr10Data.txt** (or **Ch12Pr11Data.txt**) into an R data frame. Then you can fit the regression model and look at the results using:

```
> my.reg <- lm(PbInRoots ~ PbInSoil, data = my.data)
> summary(my.reg)
```

For **part d**, the estimate of the error standard deviation σ is the square root of the mean squared error, $\sqrt{\text{MSE}}$, which is labeled **Residual standard error** in the output from `summary()`.

** For **Problem 12.12, part a**, you can compute the correlation and carry out the t test for a correlation using the `cor()` and `cor.test()` functions in R. After using `read.table()` to read the data from the file **Ch12Pr12Data.txt** into R, type:

```
> cor(my.data$NumberOfFires, my.data$AreaBurned)
> cor.test(my.data$NumberOfFires, my.data$AreaBurned)
```

The hypotheses for the t test for a correlation can be stated in words as:

H_0 : The population correlation = 0

H_a : The population correlation $\neq 0$

For **parts b and c**, use the `lm()` and `summary()` functions.

For **part d**, the R^2 value is labeled **Multiple R-squared** in the output from `summary()`, and this value is also the “proportion of variation” asked

for.