

Assignment 6 STAT 315-463: Multivariable Statistical Methods and Applications

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QUESTION 1 Generalised additive models

```
# Read in the datasets and convert the string "Date" into Date datatype variables
CCC05 <- read.table("CCC05.csv", header = TRUE, sep = ',', na.strings = "na")
CCC05$Date <- as.Date(CCC05$Date, "%d/%m/%Y")
ECAN93 <- read.table("ECAN93.csv", header = TRUE, sep = ',', na.strings = "na")
ECAN93$Date <- as.Date(ECAN93$Date, "%d/%m/%Y")
```

```
library(gam)
```

```
## Loading required package: splines
```

```
## Loading required package: foreach
```

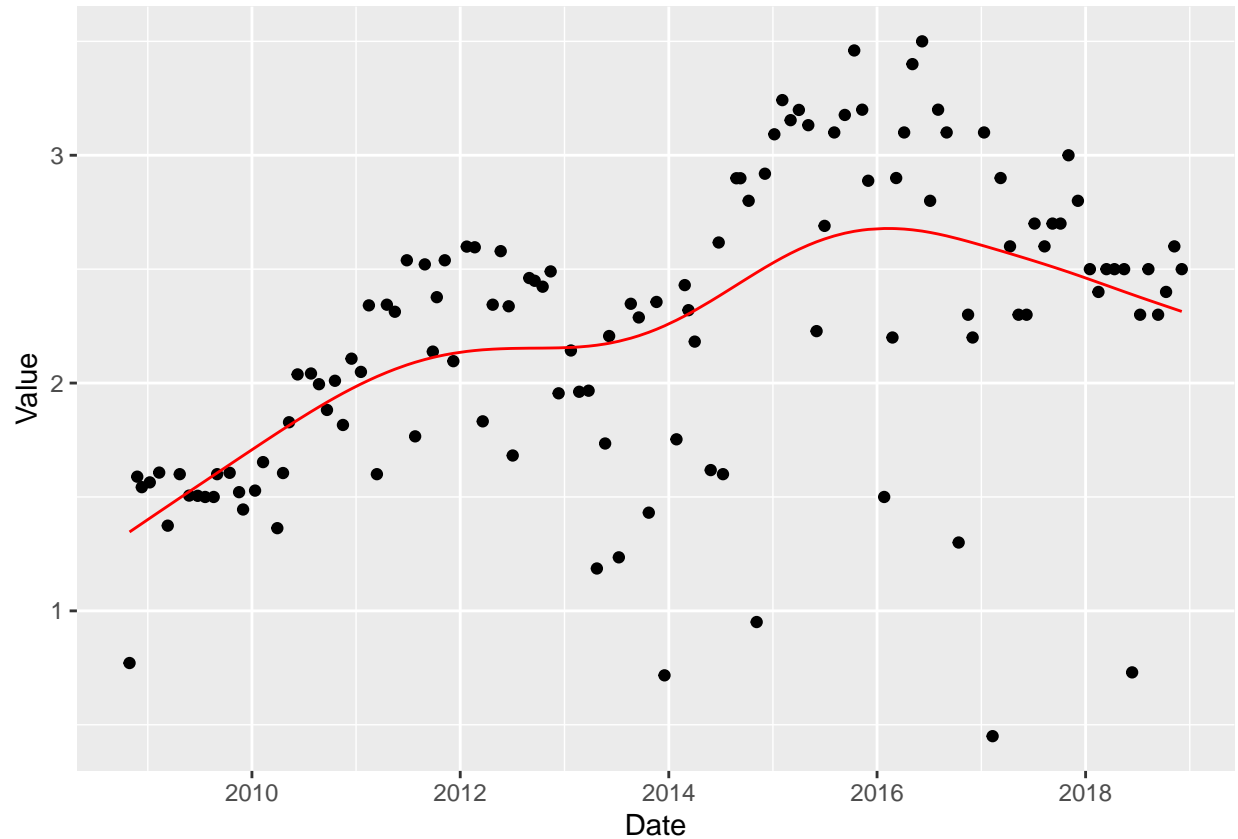
```
## Loaded gam 1.22-2
```

```
library(ggplot2)
```

```
# Fit a series of GAMs to the Value using a smoother on Date
# Start with the simple one variable model
```

```
CCC05.gam <- gam(Value ~ s(Date), data = CCC05)
pred <- predict(CCC05.gam)
```

```
ggplot(data = CCC05, aes(x = Date, y = Value)) +
  geom_point() +
  geom_line(aes(x=Date, y=pred), colour = "red")
```



QUESTION 2 Multiple Comparisons

- Carry out an analysis of variance on the data with Herbicide as the explanatory variable and "Grass_percent" as the response.
- Discuss the residuals
- Carry out an LSD type analysis comparing all possible pairs of treatments. Note which pairs have a significant difference.
- Carry out pairwise comparisons using Bonferroni, Tukey and Dunnett adjustments and in each case show the pairs with significant differences.
- How do the conclusions in (c) and (d) differ?