E80 Data Analysis: Temperature at First Depth

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Load, separate data into desired vectors.

```
# load data
location1temps = read.csv("~/Downloads/Temp Data Analysis - Depth 1.csv")

# identify columns
colnames(location1temps) = c("t1145","t1","t145", "t210", "t245")

# assign vectors for desired times- isolate nonzero values from matrix
# exported from matlab
t1145 = (location1temps$t1145[1:201])
t1 = (location1temps$t1[1:84])
t145 = (location1temps$t145[1:119])
t210 = (location1temps$t210[1:121])
t245 = (location1temps$t245[1:138])
```

Means and basic plot.

Next we average the data sets, and plot the temperature voltage over time of day.

```
mean(t1145)
```

```
## [1] 0.7623168
```

```
mean(t1)
```

```
## [1] 0.7537608
```

```
mean(t145)
```

```
## [1] 0.830157
```

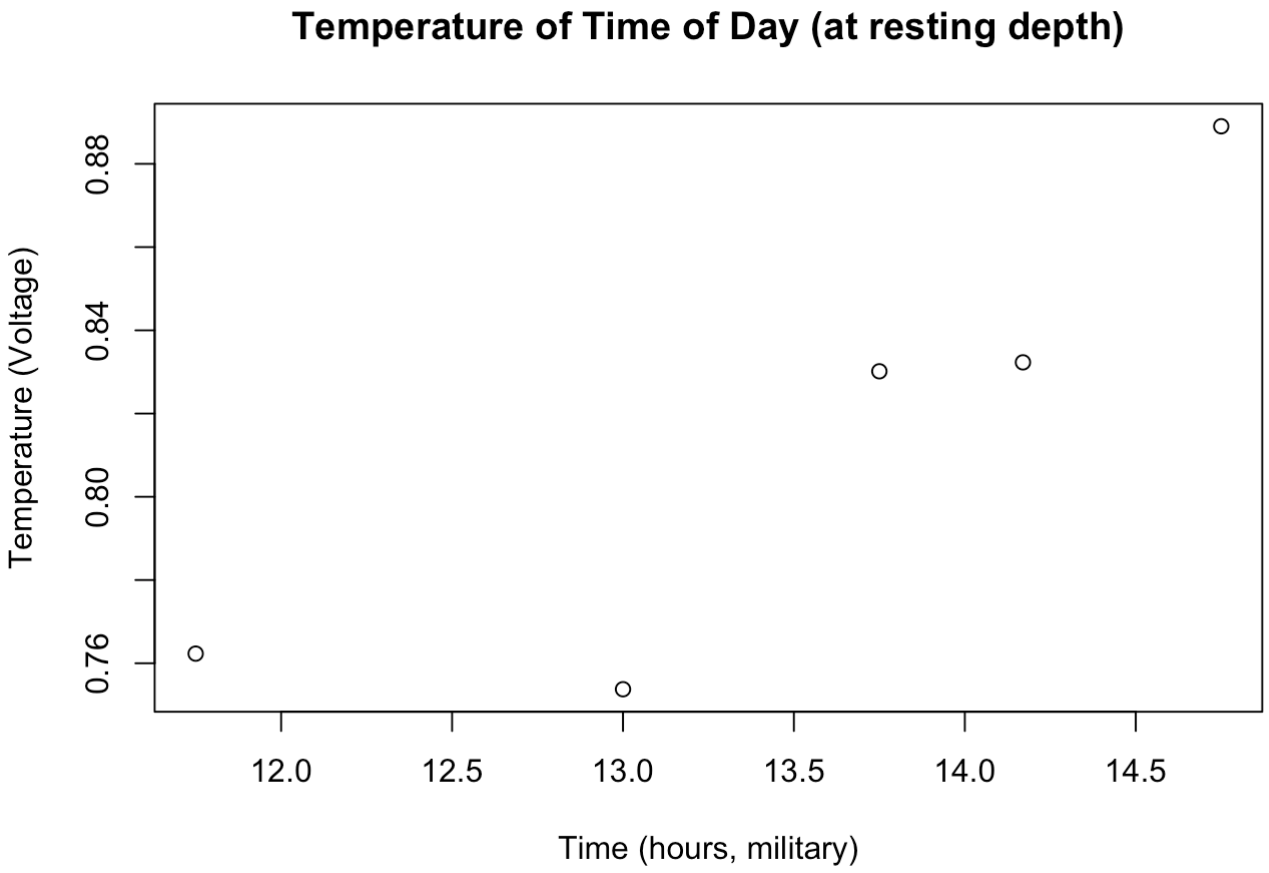
```
mean(t210)
```

```
## [1] 0.8323065
```

```
mean(t245)
```

```
## [1] 0.8890271
```

```
averages = c(mean(t1145),mean(t1),mean(t145),mean(t210),mean(t245))
avgtimes = c(11.75, 13, 13.75, 14.17, 14.75)
plot(avgtimes,averages,main = "Temperature of Time of Day (at resting depth)", ylab='Tem
perature (Voltage)', xlab='Time (hours, military)')
```



Next we check for normality- the ANOVA test is ideal for comparing more than two data sets, but makes three assumptions. First, that the data is randomly sampled from the population. We sampled at a consistent 10Hz over data with random noise, so the data would be consistently varying in a random manner. Second, the data must have similar variances. For the ANOVA test, this means variances within an order of magnitude. Third, the data must be normally distributed. However, the ANOVA is relatively strongly resistant for variations from normality, in the case of large sample sizes (which we have here). Method: We calculate and compare the variance of each set. For normality, we use a qq-plot. In this display, the data is graphed as points above a line representing perfect normality. The closer the data is to the line, the better its level of normality.

```
var(t1145)
```

```
## [1] 5.452316e-05
```

```
var(t1)
```