

# Topics in Advanced Statistical Computing

## Project 3; Problem 6

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```
load("q6output.RData")

output_damage %>%
  slice(-1) %>%
  dplyr::select(-c(zscore)) %>%
  mutate(pvalue = 2 * (1 - pnorm(abs(estimate / smoothsd)))) %>%
  mutate(pvalue = replace(pvalue, estimate == 0, NA)) %>%
  relocate(variable, estimate, smoothsd, pvalue) %>%
  filter(estimate != 0) %>%
  knitr::kable(
    col.names = c("Covariate", "Estimate", "SE", "p-value", "Left CI", "Right CI")
    , format = "simple"
    , d = 4
  )
```

| Covariate    | Estimate | SE     | p-value | Left CI | Right CI |
|--------------|----------|--------|---------|---------|----------|
| season       | 0.0399   | 0.0004 | 0.0000  | 0.0392  | 0.0406   |
| monthJuly    | -0.5762  | 0.0192 | 0.0000  | -0.6137 | -0.5386  |
| monthOctober | 0.4680   | 0.0074 | 0.0000  | 0.4536  | 0.4824   |
| percent_usa  | 0.0001   | 0.0001 | 0.1052  | 0.0000  | 0.0003   |
| beta_1       | 10.5907  | 0.2533 | 0.0000  | 10.0943 | 11.0871  |
| beta_2       | -3.3668  | 0.1255 | 0.0000  | -3.6128 | -3.1208  |
| beta_3       | 2.4291   | 0.0669 | 0.0000  | 2.2979  | 2.5603   |

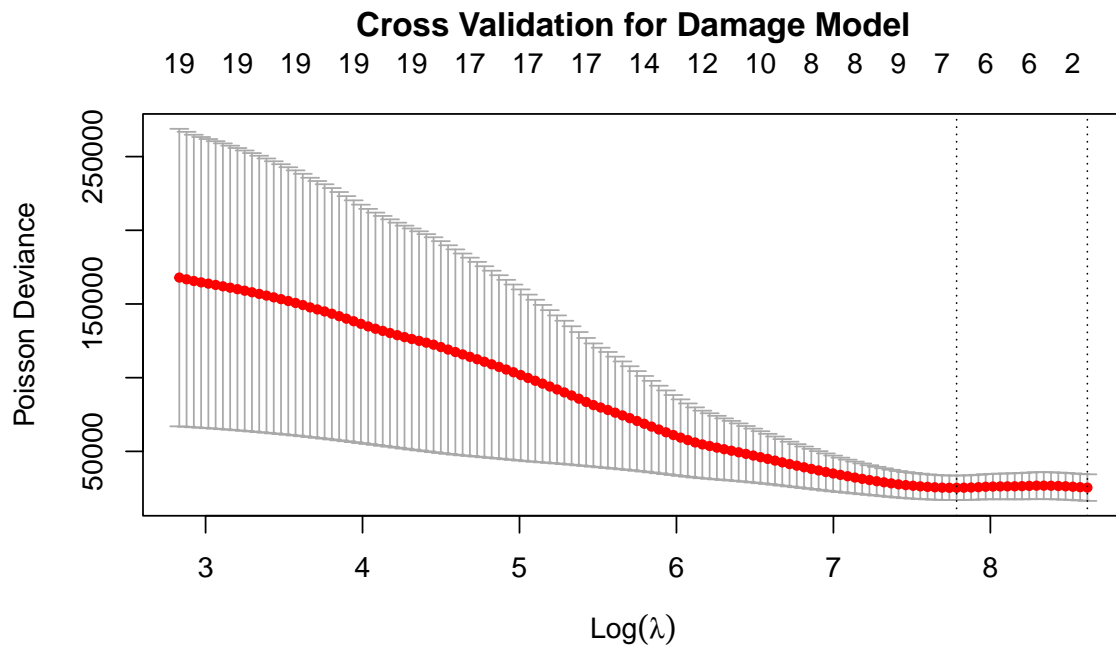
```
output_deaths %>%
  slice(-1) %>%
  dplyr::select(-c(zscore)) %>%
  mutate(pvalue = 2 * (1 - pnorm(abs(estimate / smoothsd)))) %>%
  mutate(pvalue = replace(pvalue, estimate == 0, NA)) %>%
  relocate(variable, estimate, smoothsd, pvalue) %>%
  filter(estimate != 0) %>%
  knitr::kable(
    col.names = c("Covariate", "Estimate", "SE", "p-value", "Left CI", "Right CI")
    , format = "simple"
    , d = 4
  )
```

| Covariate    | Estimate | SE     | p-value | Left CI | Right CI |
|--------------|----------|--------|---------|---------|----------|
| season       | 0.0385   | 0.0013 | 0.0000  | 0.0359  | 0.0410   |
| monthJuly    | -3.7255  | 0.1095 | 0.0000  | -3.9401 | -3.5108  |
| monthOctober | 0.8073   | 0.0484 | 0.0000  | 0.7124  | 0.9022   |

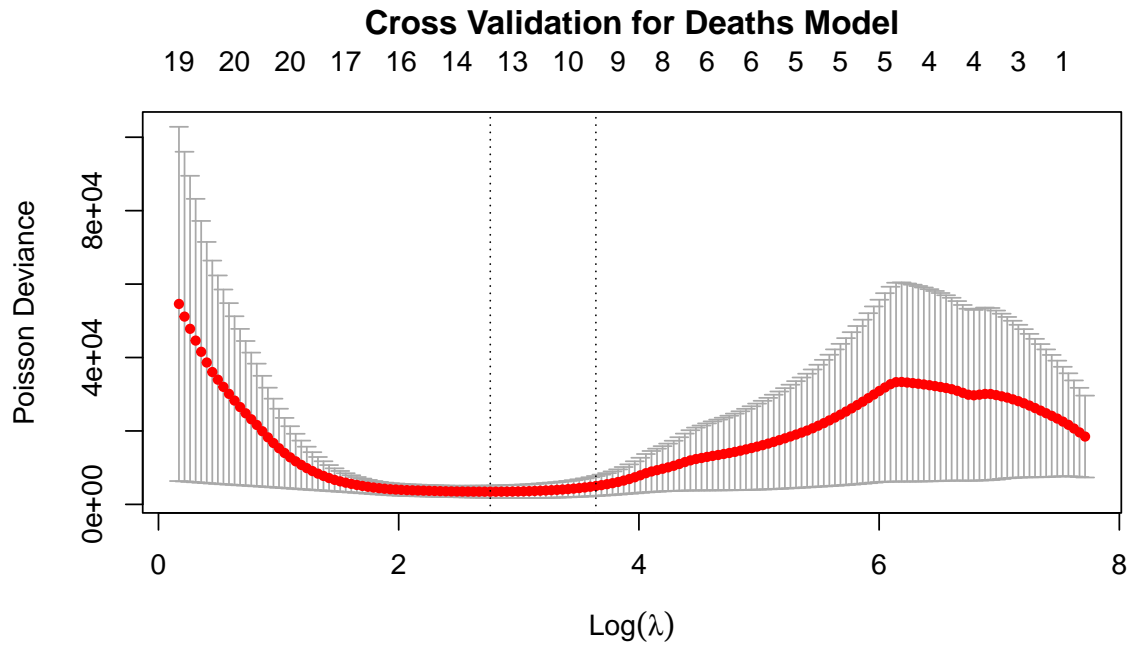
| Covariate    | Estimate | SE     | p-value | Left CI  | Right CI |
|--------------|----------|--------|---------|----------|----------|
| natureNR     | 3.6402   | 0.1214 | 0.0000  | 3.4022   | 3.8782   |
| natureTS     | 3.1078   | 0.0774 | 0.0000  | 2.9560   | 3.2596   |
| maxpressure  | -0.0379  | 0.0049 | 0.0000  | -0.0474  | -0.0283  |
| hours        | 0.0054   | 0.0002 | 0.0000  | 0.0050   | 0.0057   |
| percent_poor | 0.0568   | 0.0005 | 0.0000  | 0.0558   | 0.0578   |
| percent_usa  | -0.0007  | 0.0005 | 0.1436  | -0.0016  | 0.0002   |
| beta_0       | 23.0045  | 0.5643 | 0.0000  | 21.8985  | 24.1104  |
| beta_1       | -10.9904 | 2.0393 | 0.0000  | -14.9873 | -6.9935  |
| beta_2       | 1.1669   | 0.7284 | 0.1092  | -0.2608  | 2.5945   |
| beta_3       | 17.3277  | 0.3498 | 0.0000  | 16.6421  | 18.0132  |

```
load("q6charts.RData")
```

```
plot(cv_damage, main = "Cross Validation for Damage Model\n")
```



```
plot(cv_deaths, main = "Cross Validation for Deaths Model\n")
```



```
hurr <-
  read_csv("hurricaneoutcome2.csv", show_col_types = FALSE) %>%
  janitor::clean_names() %>%
  mutate(damage = as.numeric(str_replace(damage, "\\$", ""))) %>%
  dplyr::select(-c(hurricane_id, season, month, nature))

gtsummary::tbl_summary(
  as_tibble(apply(hurr, 2, scale))
  , statistic = list(all_continuous() ~ "{min}, {p25}, {p50}, {p75}, {max}")
)
```

```
## Table printed with `knitr::kable()`, not {gt}. Learn why at
## https://www.danielsjoberg.com/gtsummary/articles/rmarkdown.html
## To suppress this message, include `message = FALSE` in code chunk header.
```

| Characteristic | N = 43                             |
|----------------|------------------------------------|
| damage         | (-0.46, -0.43, -0.33, -0.09, 5.19) |
| deaths         | (-0.29, -0.28, -0.27, -0.22, 5.81) |
| maxspeed       | (-1.94, -0.81, 0.14, 0.89, 1.64)   |
| meanspeed      | (-1.67, -0.82, -0.02, 0.74, 2.18)  |
| maxpressure    | (-3.88, -0.57, 0.10, 0.32, 2.09)   |
| meanpressure   | (-3.94, 0.24, 0.31, 0.36, 0.41)    |
| hours          | (-1.87, -0.85, 0.00, 0.74, 2.50)   |
| total_pop      | (-0.98, -0.69, -0.37, 0.13, 2.74)  |
| percent_poor   | (-0.30, -0.30, -0.30, -0.29, 3.64) |
| percent_usa    | (-1.22, -1.22, 0.14, 0.96, 1.14)   |