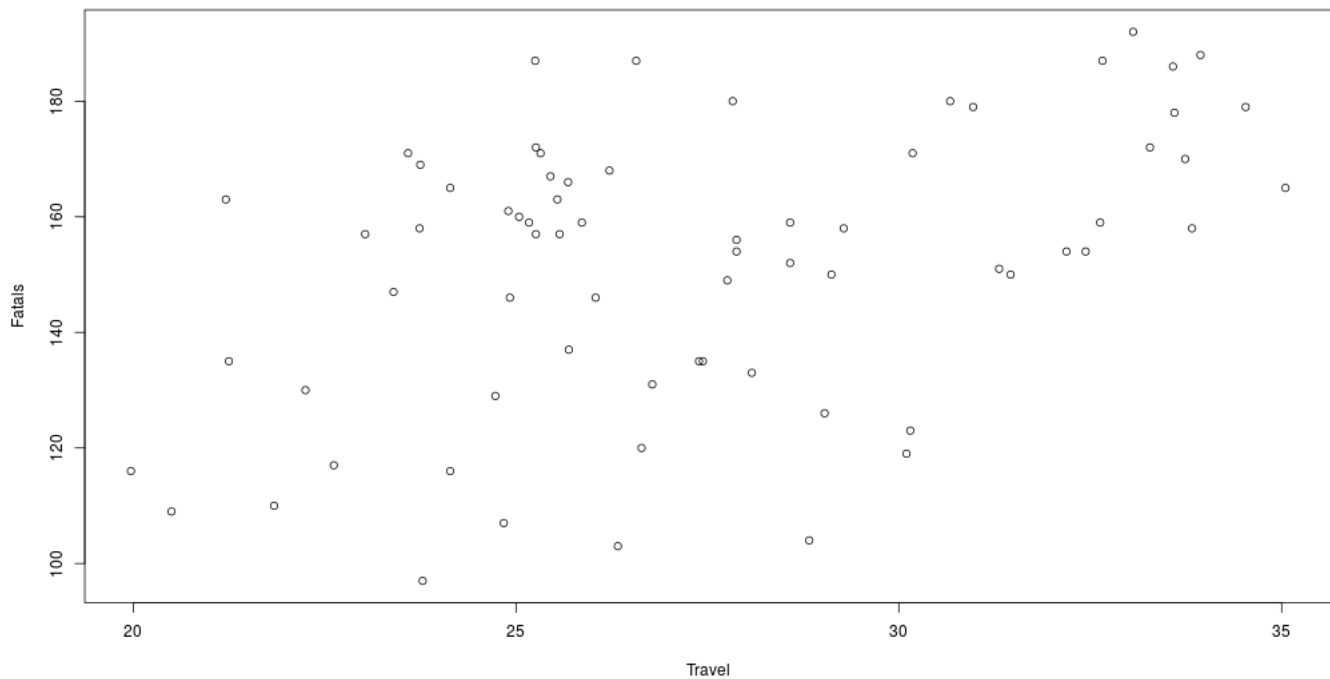

STAT 463: Homework 7

Name: Kyle Salitrik | **ID#:** 997543474 | **PSU ID:** *kps168*

April 10, 2018

PROBLEM 1

a)

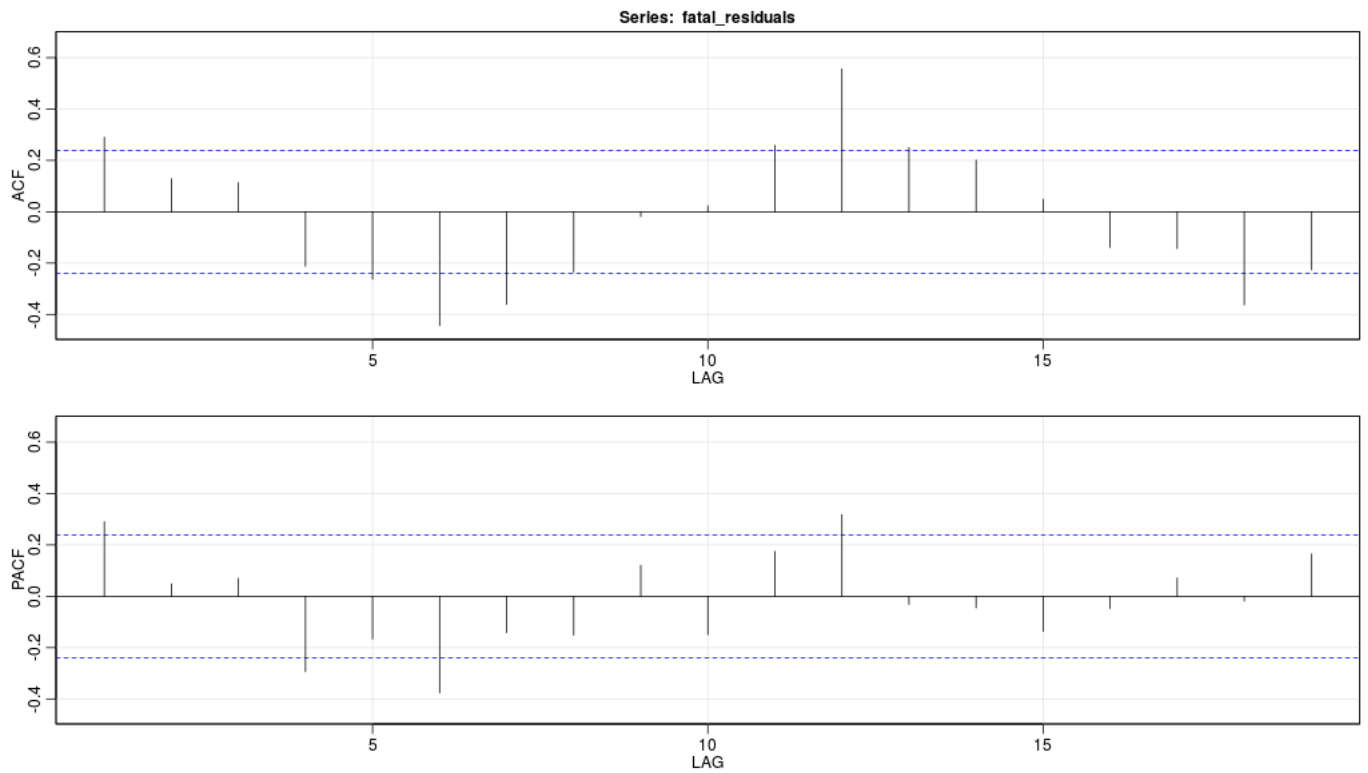


Performing a simple linear regression on the above data, the following information was obtained:

- Intercept: 16.75850
- Intercept SE: 2.69288
- Slope: 0.07027
- Slope SE: 0.01754

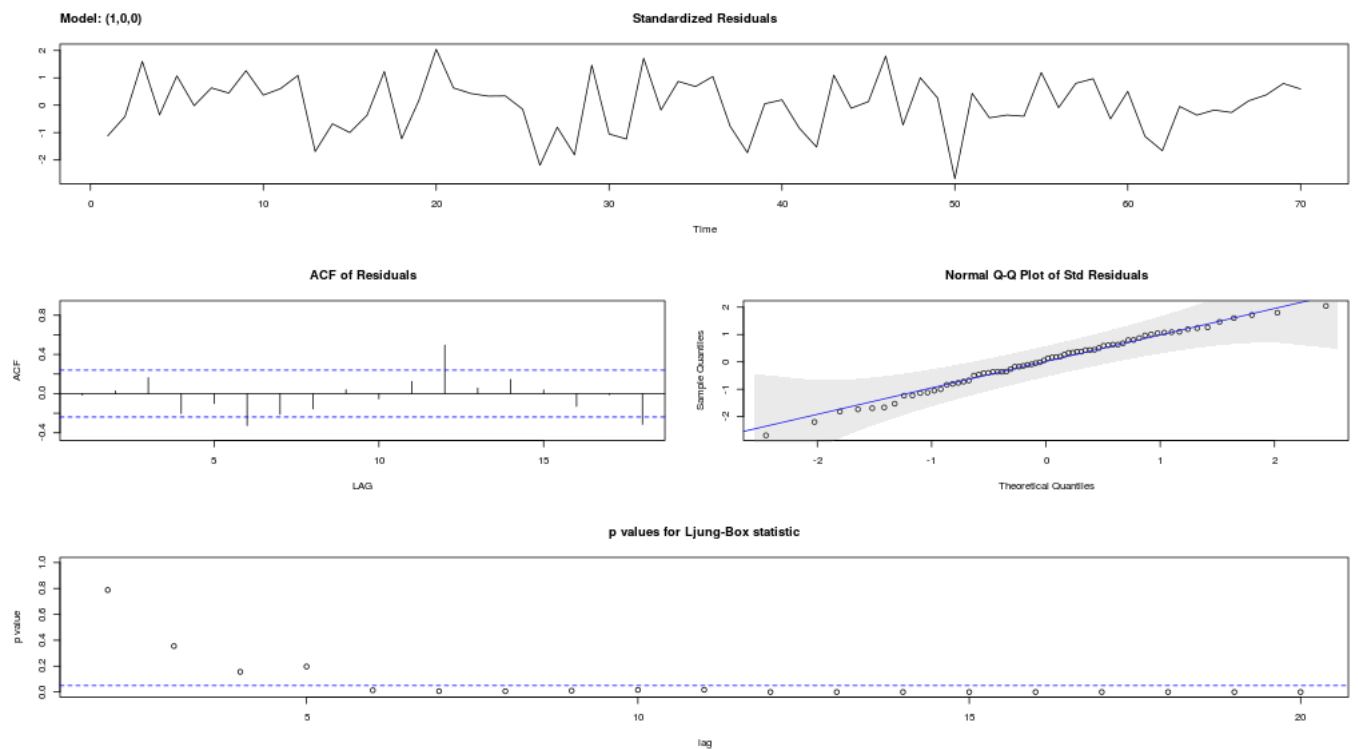
b)

Based on the ACF plots of the residuals, it appears that an ARIMA model of (1,0,0) would be a good fit.



c)

Based on the arima model chosen, the diagnostic plots look okay. The Ljung-Box plot is fairly bad, but the QQ plot and ACF plots look alright.



d)

After performing the adjustment regression, the following new slope and intercept information was obtained:

- Intercept: 54.4500

- Intercept SE: 13.2512
- Slope: 2.7183
- Slope SE: 0.6784

e)

Using the Cochrane-Orcutt function yielded the following results

- Intercept: 86.08247
- Intercept SE: 23.98510
- Slope: 2.41695
- Slope SE: 0.85958

PROBLEM 2

The following R code was created for problem 2:

```
#####
#### Problem 2
#####
fatal_diff = diff(fatals)
travel_diff = diff(travel)

lm_diffs = lm(fatal_diff ~ travel_diff)
png("./figures/p2_lm_diff_acf", width = 1024, height = 576)
acf2(residuals(lm_diffs))
dev.off()

lm_diffs_no_int = lm(fatal_diff ~ 0 + travel_diff)

fatal_mean = mean(fatals)
travel_mean = mean(travel)

diff_slope = 1.936
diff_slope_se = 1.402
diff_int = travel_mean - diff_slope * fatal_mean
```

PROBLEM 3

The forecasting yielded significantly different results for the two methods. The Cochrane-Orcutt model forecast was 55.29775 and the difference method forecast was 130.3482.

The residual for the CO method was -133.6638 and 234.8415 was the difference method's residual value.