

# **Seasonality in Seoul: Multilinear Modeling with Kth Differences and Fixed Effects**

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# Abstract

## 1 Problem and Motivation

### 1.1 Data Description

In this analysis we used data from UC Irvine's Machine Learning's Repository. We accessed [Seoul Bike Sharing Data](#), which contains 8,760 rows of hourly data pertaining to the corresponding amount of rented bikes (bike demand) in Seoul, Korea. 8,465 rows are considered "functioning days," where bikes are able to be rented. In order to consider our problem of interest, we will only consider these 8,465 rows to model the bike demand in Seoul. This data set also contains corresponding data for the respective temperature (celcius), humidity (%), wind speed (m/s), visibility (10m), dew point temperature (celcius), solar radiation ( $MJ/m^2$ ), rainfall precipitation (mm), snowfall precipitation (cm), seasons (Winter, Spring, Summer, Autumn), and an indicator determining whether the corresponding day is a holiday.

We will use these variables along with a subset of interaction terms which will be determined by elastic net regression to include in our models.

### 1.2 Questions of Interest

1. Can we use factors in weather and time to determine the best predictors of short-run fluctuations in temperature for the climate in Seoul, Korea?
2. Can we determine which weather and time factors affect the bike sharing demand the most in Seoul, Korea?

If there are significant predictive factors, which one has the largest influence?

## Regression Methods

Temperature is highly dependent on the temperature from the hour before ( $t - 1$ ):  $\frac{\hat{Cov}(\text{Temperature}_t, \text{Temperature}_{t-1})}{\hat{Var}(\text{Temperature}_t)} = 0.9968$  (which is significant). Since we have hourly data, running a first difference regression model will, though eliminate the dependency on the value from  $t - 1$ , may also leave the dependency from  $t - 2, \dots, t - (k - 1)$  left over. If  $\Delta \text{Temperature}_t = \text{Temperature}_t - \text{Temperature}_{t-k}$ , We will find the  $k$  (the  $k$ th difference) such that there is no longer a direct dependency between  $\Delta \text{Temperature}_t$  and  $\Delta \text{Temperature}_{t-k}$ . In other words, We want to find the smallest possible  $k$  such that  $cov(\Delta \text{Temperature}_t, \Delta \text{Temperature}_{t-k}) = 0$ .

We found that the optimal choice of  $k$  was 5 (see [A.0](#) for optimal selection process on  $k$ ).

We also hypothesized that since there are seasonal effects that are unobservable in our data set, the error term,  $\epsilon$  is composed of a season-specific error term,  $\alpha_s$ , and everything else that may affect fluctuations in temperature that varies by time period ( $t$ ) and the season, which aren't possible to explicitly include in the model. Hence,  $\epsilon_{st} = \alpha_s + \eta_{st}$ . Let  $s$  denote the season and  $t$  denote time. For our data set-specific purposes, we will seek to understand how Temperature <sub>$st$</sub>  changes with respect to each season and hour ( $t$ ).

Hence, with highly dependent time series data, we will resort to using a  $k$ th-differences regression model to model the short-run fluctuation in temperature where  $k = 5$ . In other words, we are going to try to see how temperature changes every five hours and see which factors affect those changes the most.

Hence, for our basic multivariate regression model (w/o interaction terms), if

$$\text{Temperature}_{st} = \beta_0 + \beta_1 \text{Humidity}_{st} + \beta_2 \text{DewPointTemp}_{st} + \beta_3 \text{WindSpeed}_{st} + \beta_4 \text{SolarRadiation}_{st} + \beta_5 \text{Rainfall}_{st} + \beta_6 \text{Snowfall}_{st} + \beta_7 I(\text{Hour}_t = 1) + \dots + \beta_{29} I(\text{Hour}_t = 23) + \alpha_s + \eta_{st}$$

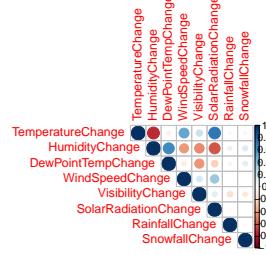
Then,

$$\text{Temperature}_{st-5} = \beta_0 + \beta_1 \text{Humidity}_{st-5} + \beta_2 \text{DewPointTemp}_{st-5} + \beta_3 \text{WindSpeed}_{st-5} + \beta_4 \text{SolarRadiation}_{st-5} + \beta_5 \text{Rainfall}_{st-5} + \beta_6 \text{Snowfall}_{st-5} + \beta_7 I(\text{Hour}_{t-5} = 1) + \dots + \beta_{29} I(\text{Hour}_{t-5} = 23) + \alpha_s + \eta_{st-5}$$

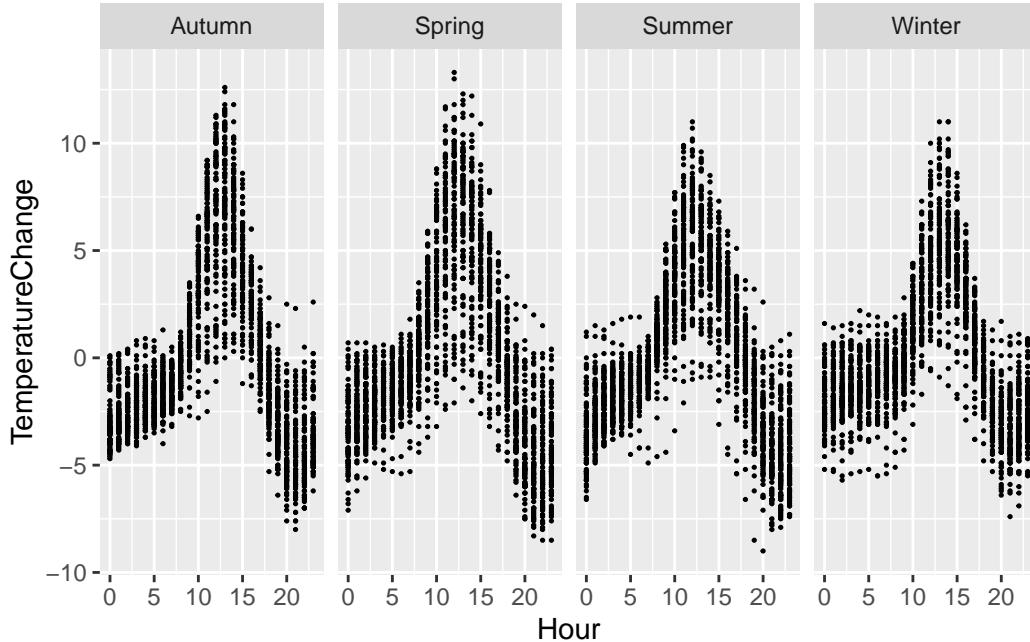
Thus, we wish to estimate,

$$(1) \Delta \text{Temperature}_{st} = \beta_1 \Delta \text{Humidity}_{st} + \beta_2 \Delta \text{DewPointTemp}_{st} + \beta_3 \Delta \text{WindSpeed}_{st} + \beta_4 \Delta \text{SolarRadiation}_{st} + \beta_5 \Delta \text{Rainfall}_{st} + \beta_6 \Delta \text{Snowfall}_{st} + \Delta \beta_7 I(\text{Hour}_t = 1) + \dots + \Delta \beta_{29} I(\text{Hour}_t = 23) + \Delta \eta_{st}$$

Where  $\Delta \text{Temperature}_{st} = \text{Temperature}_{st} - \text{Temperature}_{t-5}$



With our basic multilinear model (1) the correlation matrix indicates that there may be some potential multicollinearity between DewPointTempChange <sub>$st$</sub>  and HumidityChange <sub>$st$</sub> . For the most part, the indicators look good with changes in SolarRadiation <sub>$st$</sub>  potentially affecting fluctuations in temperature the most.



According to our model, changes in temperature not only depend on temperature but also on season. While there are some general linear trends across some ranges of hours, the non-linearity of the hours in general with respect to temperature change led us to include indicators for each hour as specified in Model (1) using Hour 0 (12:00 a.m.) as our base year.

According to the model diagnostics A.1.0, the linearity assumption seems to be met (see A.1 for added variable plots). Additionally, though there were some points moving the model away from homoskedasticity the  $\sqrt{|\text{Standardized residuals}|}$  vs. Fitted values Plot shows that homoskedasticity is roughly met. However, the normality assumption was blatantly violated so we considered adding interaction terms.

We used elastic net regression to select interaction terms to see if the influential points (and thus, Normality) could be remedied. We used elastic net regression over lasso regression due to the potential collinearity between  $\text{HumidityChange}_{st}$  and other weather effects.

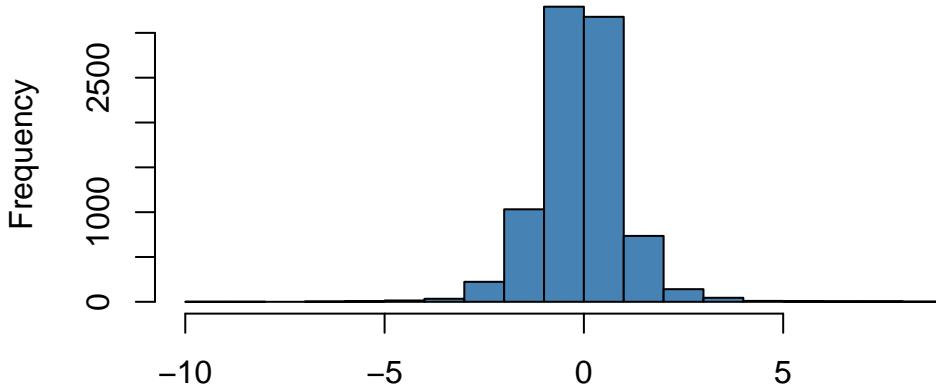
(See A.2.0 for model output)

However, even with selected interaction terms included, Normality did not drastically improve (see A.2.1 for QQ-Plot).

We considered transforming the model (A.3) to better meet Normality and somewhat homoskedasticity. However, due to the nature of our  $X$  variable matrix—since each independent variable is a change in a variable, we thus had to shift the entire vector of that corresponding variable in order to derive optimal transformations. Hence, interpreting the any transformations we would make would prove difficult and impractical.

However, with large sample size ( $n = 8740$ ), Normality could be appealed to. The residuals do appear to be Normal, though extreme values cause deviations from Normality at the tails as seen in the QQ-plot. We considered alternatives to meeting the assumptions such as linear robust regression to reduce the weights of outliers. One alternative is further discussed in A.4, where we considered estimating a model for each season.

### Histogram of Residuals from Elastic Net Regression



Since the histogram of the residuals appears Normal, aside from the extreme values at the tails, we will appeal to Normality due to the large sample size.

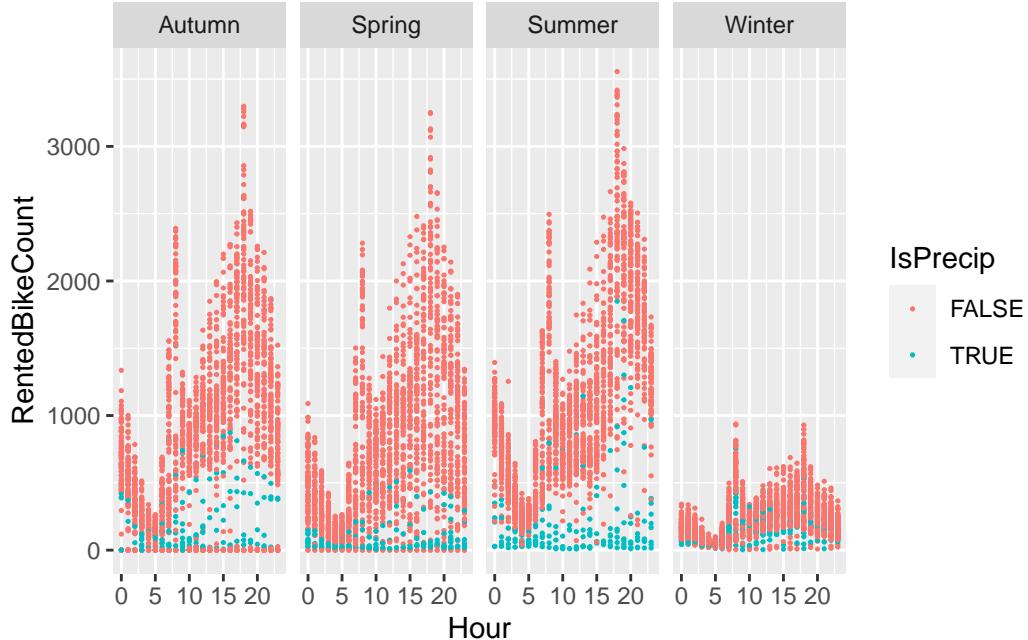
Additionally, diagnostics (A.2.1) show that there no unduly outliers, and linearity and homoskedasticity are met.

Thus, using our elastic regression results, we will modify Model (1) to include the following interaction terms. We made sure to include the lower-order regression coefficients for the coefficients that elastic net regression left out when elastic net included interaction terms involving a lower-order term. We are interested in estimating the most assailant factors (A.5). See A.6 for the full model.

$$(2) \Delta\text{Temperature}_{st} = \dots + \beta_5 \Delta\text{SolarRadiation}_{st} + \dots + \beta_{32} \Delta\text{Humidity}_{st} \Delta\text{SolarRadiation}_{st} + \dots + \beta_{39} \Delta\text{SolarRadiation}_{st} \Delta\text{Rainfall}_{st} + \dots + \sum_{n=1}^{23} \beta_{131+n} \Delta\text{SolarRadiation}_{st} \Delta I(\text{Hour}_t = n) + \dots + \Delta\eta_{st}$$

$$\Delta\eta_{st} \stackrel{iid}{\sim} N(0, \sigma^2)$$

Similar to our model for temperature, we have unobserved seasonal effects in  $\epsilon$ . Instead of using a  $k$ -th-difference approach, we will use a fixed effects models to include the seasonal effects for  $s - 1$  (3) seasons to obtain unbiased estimates. We will use Spring as our base season. However, exploratory data analysis has shown that current bike demand is strongly dependent on the bike demand from previous hours. Hence, in order to include seasonal dummy variables, we also need to include a set of lagged effects ( $\delta_p$ ) conditional on Season on  $\text{RentedBikeCount}_{st} \quad \forall s \in \text{Seasons}, s \neq \text{Spring}$  to adjust for the time dependency. (See A.7 to see how we chose our set of lagged effects).



Preliminary EDA shows that precipitation (rain and snow) will have a significant negative effect on rented bike demand.

Hence, we will first estimate the hourly demand for rented bikes in Seoul with the following model,

$$(3) \quad \text{RentedBikeCount}_{st} = \beta_0 + \beta_1 \text{Humidity}_{st} + \beta_2 \text{Temperature}_{st} + \beta_3 \text{WindSpeed}_{st} + \beta_4 \text{Visibility}_{st} + \beta_5 \text{DewPointTemp}_{st} + \beta_6 \text{SolarRadiation}_{st} + \beta_7 \text{Rainfall}_{st} + \beta_8 \text{Snowfall}_{st} + \beta_9 I(\text{Day}_t = \text{Holiday}) + \beta_{10} I(\text{Hour}_t = 1) + \dots + \beta_{32} I(\text{Hour}_t = 23) + \beta_{33} I(\text{Season}_s = \text{Winter}) + \beta_{34} I(\text{Season}_s = \text{Summer}) + \beta_{35} I(\text{Season}_s = \text{Autumn}) + \delta_1 \text{RentedBikeCount}_{st-1} + \delta_{23} \text{RentedBikeCount}_{st-23} + \sum_{p=1}^9 \delta_p + \eta_{st}$$

$$\eta_{st} \stackrel{iid}{\sim} N(0, \sigma^2)$$

Diagnostics for fitting this model to this data indicate that linearity is met A.8. Additionally, due to the large sample size, the leverage plot also indicates that there were not any influential

points. However, since homoskedasticity was blatantly violated, especially for fitted values \$ < 1000\$, we modified the model by including interaction terms.

We ran an elastic net regression model to control for collinearity. (See model A.9 for model output and diagnostics). Since  $\text{RentedBikeCount}_{st}$  is likely poisson-distributed, we considered log-transforming the response, but diagnostics show that model assumptions did not improve A.10.0.

However, we noticed non-linear trends in  $\text{Humidity}_{st}$  against  $\text{RentedBikeCount}_{st}$  and introduced categorical transformations A.10.1. Using an inverse response plot, we also found that we could optimally transform  $\text{Visibility}_{st}$  using a  $\log$  transformation A.10.2. Lastly, we transformed  $\text{WindSpeed}_{st}$  since we noticed that extreme values were causing some non-linearity between the response. Hence, we introduced a categorical variable called  $\text{ExtremeWind}_{st}$  to capture this effect A.10.3.

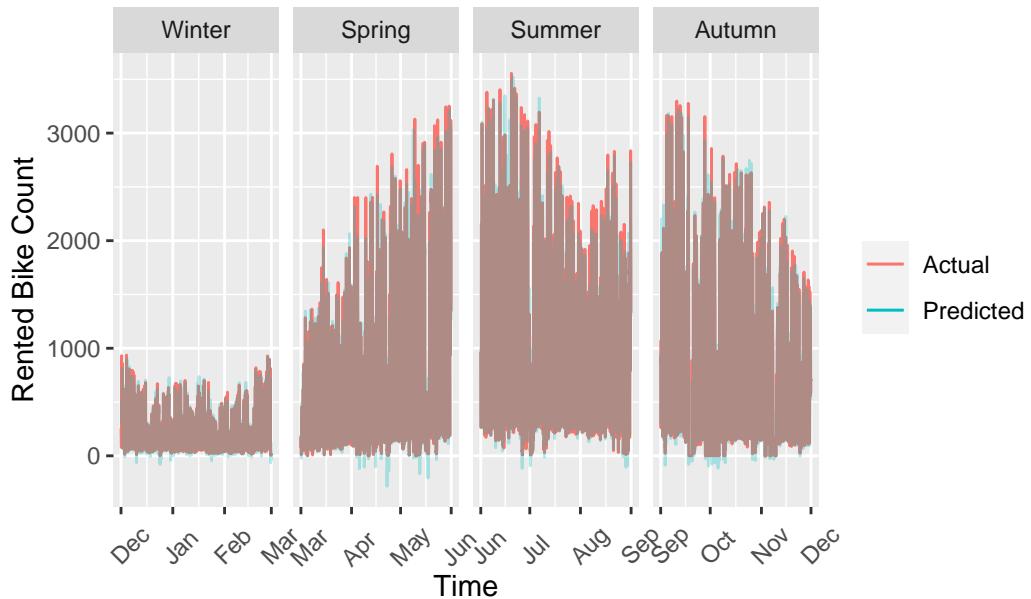
Using an elastic net regression method to determine once again the appropriate coefficients to include A.11, we have determined our final model for measuring the demand for rented bikes in Seoul,

$$(4) \quad \text{RentedBikeCount}_{st} = \beta_0 + \sum_{i=1}^9 \beta_i I(10i \leq \text{Humidity}_{st} < 10(i+1)) + \dots + \beta_{11} \text{Rainfall}_{st} + \dots + \beta_{17} \text{SolarRadiation}_{st} + \beta_{19} I(\text{Season}_s = \text{Winter}) + \beta_{20} I(\text{Season}_s = \text{Summer}) + \beta_{21} I(\text{Season}_s = \text{Autumn}) + \dots + \beta_{240} \text{SolarRadiation}_{st} I(\text{Hour}_t = 8) + \beta_{241} \text{SolarRadiation}_{st} I(\text{Hour}_t = 19) + \beta_{242} \text{Rainfall}_{st} I(\text{Hour}_t = 9) + \beta_{243} \text{Rainfall}_{st} I(\text{Hour}_t = 13) + \beta_{244} \text{Rainfall}_{st} I(\text{Hour}_t = 17) + \beta_{245} \text{Rainfall}_{st} I(\text{Hour}_t = 19) + \beta_{246} \text{Rainfall}_{st} I(\text{Hour}_t = 20) + \dots + \beta_{255} \text{SolarRadiation}_{st} I(\text{Season}_s = \text{Summer}) + \beta_{256} \text{SolarRadiation}_{st} I(\text{Season}_s = \text{Autumn}) + \beta_{257} \text{Rainfall}_{st} I(\text{Season}_s = \text{Winter}) + \sum_{i=1}^{23} \sum_{\text{All } j \in \text{Seasons}, j \neq \text{Spring}} \beta_{257+i+j \text{th Season}} I(\text{Hour}_t = i) I(\text{Season}_s = j) + \sum_{i=1}^3 \beta_{327+i} I(60 + 10i \leq \text{Humidity}_{st} < 60 + 10(i+1)) I(\text{Season}_s = \text{Autumn}) + \beta_{331} I(60 \leq \text{Humidity}_{st} < 70) I(\text{Season}_s = \text{Summer}) + \beta_{334} \text{SolarRadiation}_{st} I(60 \leq \text{Humidity}_{st} < 70) + \sum_{i=1}^4 \beta_{335+i} \text{SolarRadiation}_{st} I(50 + 10i \leq \text{Humidity}_{st} < 60 + 10(i+1)) + \sum_{i=1}^3 \beta_{339+i} \text{Rainfall}_{st} I(30 + 10i \leq \text{Humidity}_{st} < 30 + 10(i+1)) + \beta_{343} \text{Rainfall}_{st} I(90 \leq \text{Humidity}_{st} < 100) I(\text{Hour}_t = t) + \eta_{st}$$

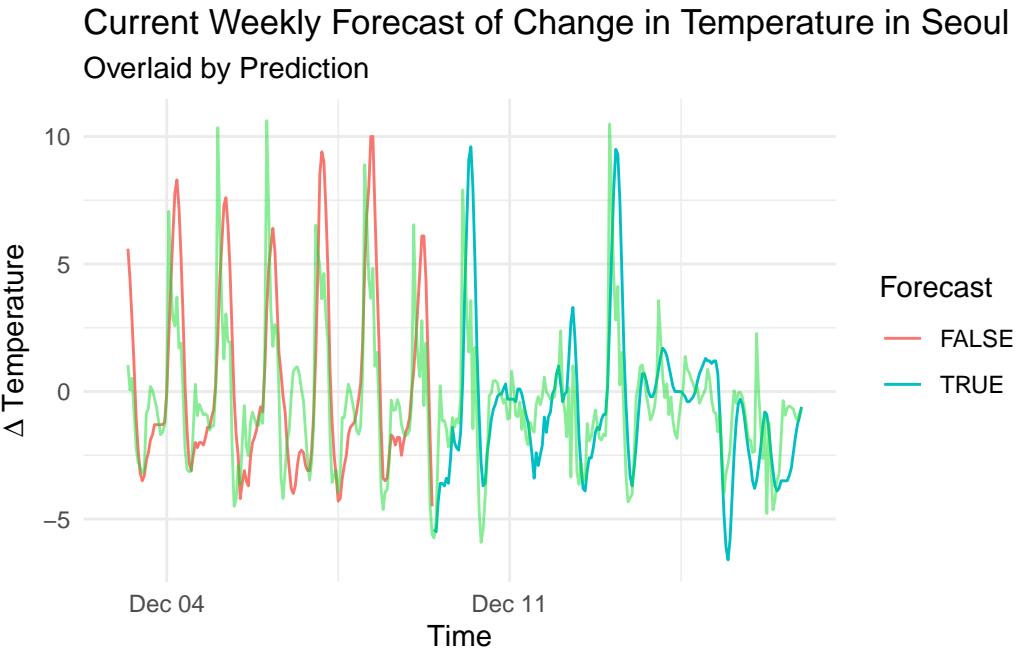
$$\eta_{st} \stackrel{iid}{\sim} N(0, \sigma^2)$$

(The full model is referenced in A.13, only assailant terms are included for simplicity.

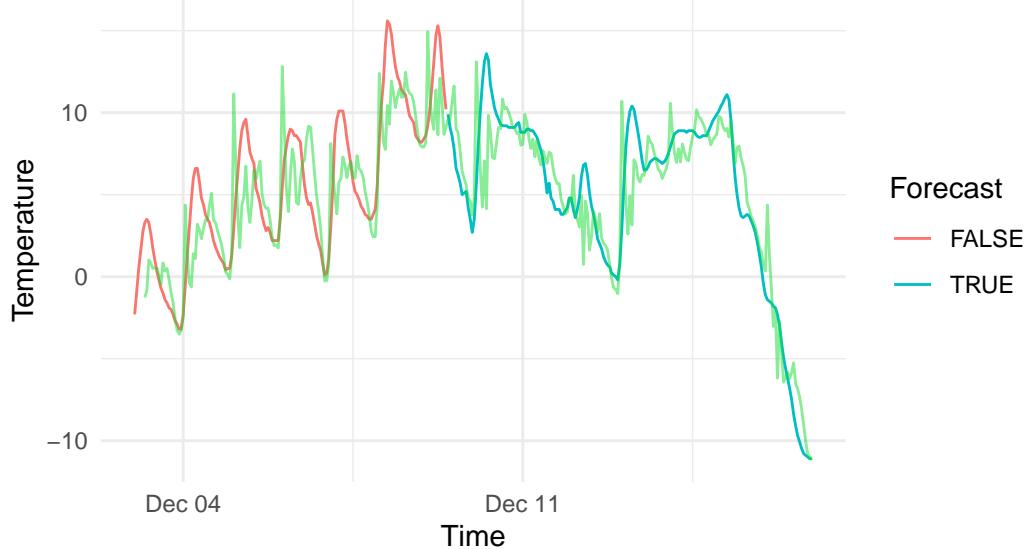
## Predicted Bike Demand in Seoul Over Time



## Forecast



## Current Weekly Forecast of in Temperature in Seoul Overlaid by Prediction



## APPENDIX

### A.0

#### Selection Process for Optimal Choice of $k$

We want  $k$  as small as possible because we want as much data for our model: Our belief is that short-run fluctuations in temperature can be determined by other short-run changes in other factors. Hence, the smaller  $k$  is, the better predictions we can make about the hour  $t$ . If we wanted to parse out a long-run effect, we would aggregate on a time period and regress over that interval. However, for the purposes of our research question, we need to be informed the most about what is happening in the short-run.

Running a  $k$ th difference regression model where  $\Delta\text{Temperature}_t = \text{Temperature}_t - \text{Temperature}_{t-k}$  we can find a sufficient  $k$  by regressing  $\Delta\text{Temperature}_{t-1}$  on  $\Delta\text{Temperature}_{t-k^*}$ , where  $k^*$  is the proposed value of  $k$ . We will choose  $k = k^*$  when the regression coefficient becomes non-significant. This (non-coincidentally) happens as the regression coefficient approaches 0, or as  $\Delta\text{Temperature}_t$  becomes less and less dependent of the  $\Delta\text{Temperature}$  from  $k^*$  hours ago.

The optimal choice of  $k$  will lead us to run a  $k$ th difference regression model where  $\Delta\text{Temperature}_t = \text{Temperature}_t - \text{Temperature}_{t-k}$ .

Optimal choice of  $k$ :

```

ks = c()
alpha = 0.1
for(k in 1:100){
  k.change = seoul$Temperature - lag(seoul$Temperature, n = 1)
  k.lm = lm(k.change ~ lag(k.change, n = k))
  k.p = summary(k.lm)$coefficients[, "Pr(>|t|)"] [2]
  if(k.p > alpha){
    ks = c(ks, k)
  }
}

```

ks

```
[1] 5 19 29 43 53 67 77 91
```

Hence, we chose  $k = 5$

### A.1.0

Regression output and diagnostics for Model (1)

```

seoul.lm = lm(TemperatureChange ~ 0 + ., data=seoul.temp[unique(seoul.change)])
summary(seoul.lm)

```

Call:

```
lm(formula = TemperatureChange ~ 0 + ., data = seoul.temp[unique(seoul.change)])
```

Residuals:

Min	1Q	Median	3Q	Max
-9.9593	-0.5910	0.0285	0.6114	11.6173

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
HumidityChange	-1.439e-01	1.854e-03	-77.608	< 2e-16 ***
DewPointTempChange	5.144e-01	7.553e-03	68.099	< 2e-16 ***
WindSpeedChange	6.783e-02	1.375e-02	4.932	8.30e-07 ***
VisibilityChange	-3.087e-04	3.525e-05	-8.759	< 2e-16 ***
SolarRadiationChange	1.091e+00	2.495e-02	43.712	< 2e-16 ***
RainfallChange	6.186e-03	8.905e-03	0.695	0.48729

```

SnowfallChange      2.268e-01  4.329e-02   5.240  1.65e-07 ***
Hour1Change        -1.645e-01  1.256e-01  -1.310   0.19034
Hour2Change        -3.219e-01  1.526e-01  -2.110   0.03487 *
Hour3Change        -4.914e-01  1.499e-01  -3.279   0.00105 **
Hour4Change        -6.358e-01  1.156e-01  -5.501   3.89e-08 ***
Hour5Change        -7.538e-01  6.261e-02 -12.040   < 2e-16 ***
Hour6Change        -8.368e-01  1.344e-01  -6.224   5.06e-10 ***
Hour7Change        -9.824e-01  1.546e-01  -6.355   2.19e-10 ***
Hour8Change        -9.756e-01  1.464e-01  -6.662   2.87e-11 ***
Hour9Change        -9.226e-01  1.042e-01  -8.855   < 2e-16 ***
Hour10Change       -6.220e-01  9.017e-02  -6.898   5.64e-12 ***
Hour11Change       -2.461e-01  1.454e-01  -1.693   0.09054 .
Hour12Change       1.687e-01  1.605e-01   1.051   0.29338
Hour13Change       5.972e-01  1.478e-01   4.041   5.37e-05 ***
Hour14Change       1.084e+00  9.636e-02  11.245   < 2e-16 ***
Hour15Change       1.463e+00  1.101e-01  13.286   < 2e-16 ***
Hour16Change       1.743e+00  1.501e-01  11.612   < 2e-16 ***
Hour17Change       1.770e+00  1.570e-01  11.274   < 2e-16 ***
Hour18Change       1.627e+00  1.361e-01  11.958   < 2e-16 ***
Hour19Change       1.327e+00  6.489e-02  20.445   < 2e-16 ***
Hour20Change       9.682e-01  1.161e-01   8.341   < 2e-16 ***
Hour21Change       6.576e-01  1.500e-01   4.383   1.19e-05 ***
Hour22Change       3.900e-01  1.526e-01   2.555   0.01063 *
Hour23Change       1.628e-01  1.257e-01   1.295   0.19535
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

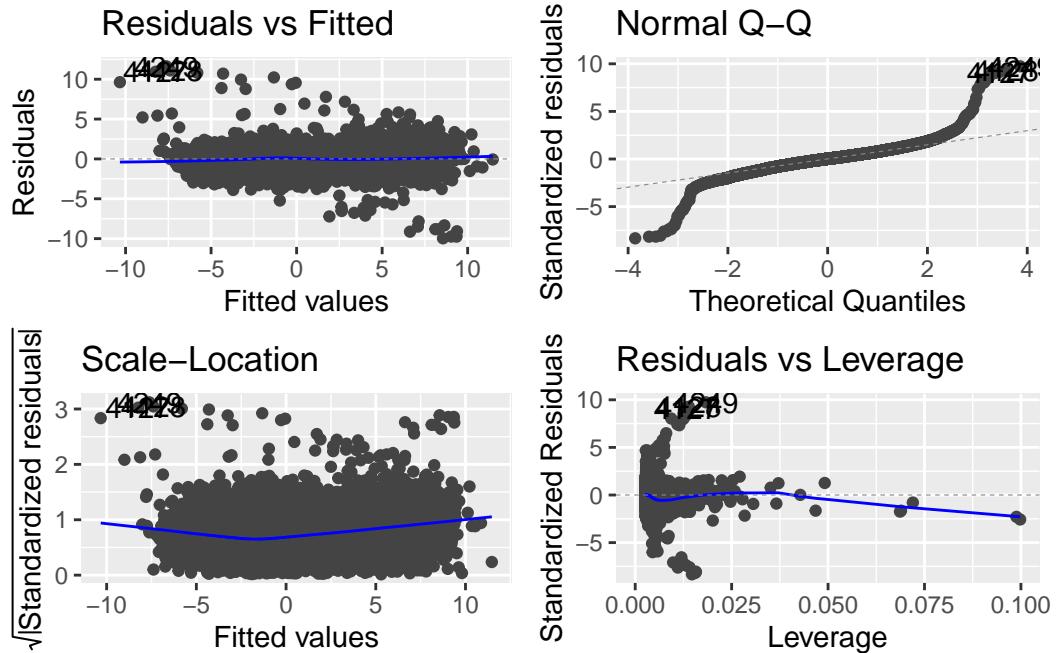
```

```

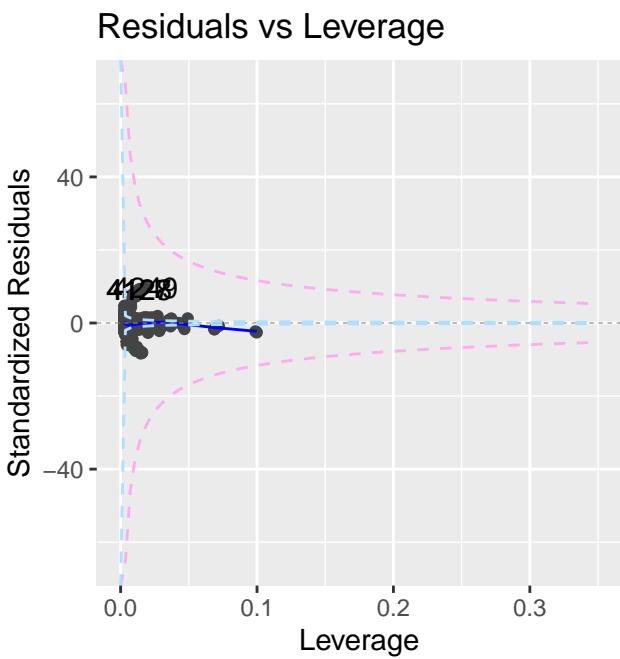
Residual standard error: 1.205 on 8710 degrees of freedom
Multiple R-squared:  0.8989,    Adjusted R-squared:  0.8985
F-statistic:  2581 on 30 and 8710 DF,  p-value: < 2.2e-16

```

```
 autoplot(seoul.lm)
```



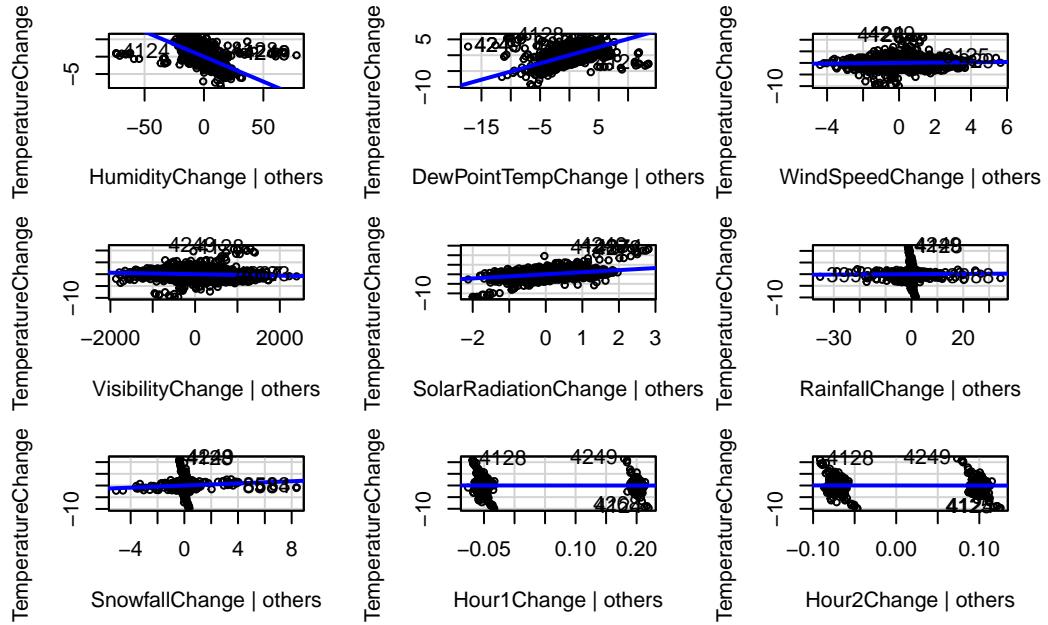
```
show_leverage(seoul.lm)
```

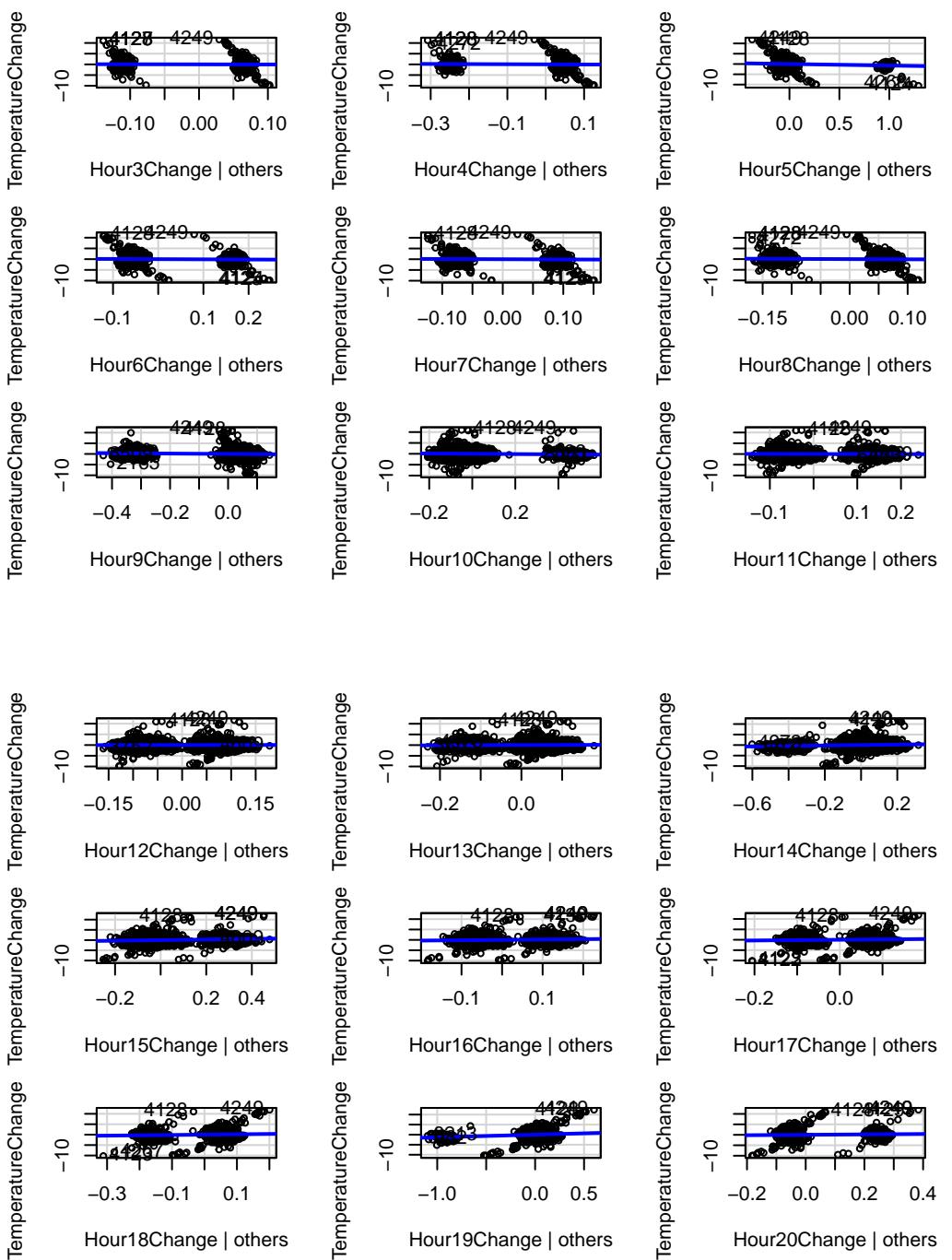


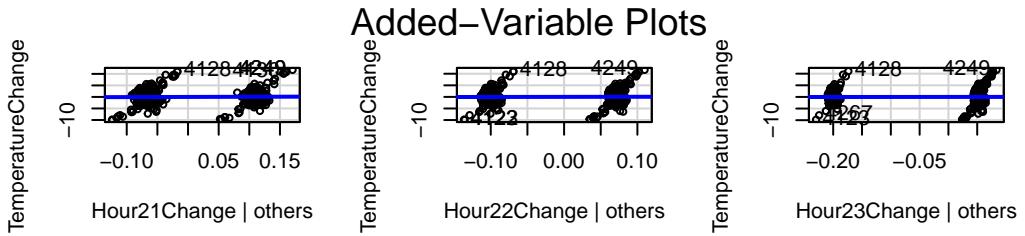
### A.1.1

Added Variable Plots for Model (1). After considering the influential points, we determined that the linearity assumption was met.

```
avPlots(seoul.lm)
```







## A.2.0

Elastic Net Regression on Model (1) w/ interaction terms

```

model.factors = setdiff(c(seoul.change, seoul.interaction),
                        c(seoul.base, "TemperatureChange"))

seoul.x = as.matrix(seoul.temp[model.factors])
seoul.y = as.matrix(seoul.temp["TemperatureChange"])

elastic_cv <- cv.glmnet(x = seoul.x,
                        y = seoul.y,
                        type.measure = "mse",
                        alpha = 0.5)

d = coef(elastic_cv, s = "lambda.1se")[2:(length(model.factors)-1)]
elastic.factors = c(model.factors[which(d != 0)])
elastic.factors = c(elastic.factors, setdiff(c(str_c(time.bike, "Change"), "RainfallChange",
seoul.elastic = lm(TemperatureChange ~ 0 + .,
                    seoul.temp[c("TemperatureChange",
elastic.factors]))
```

```
summary(seoul.elastic)
```

Call:

```
lm(formula = TemperatureChange ~ 0 + ., data = seoul.temp[c("TemperatureChange",  
elastic.factors)])
```

Residuals:

Min	1Q	Median	3Q	Max
-9.0696	-0.6740	-0.0675	0.4804	8.9915

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
HumidityChange	-1.514e-01	1.852e-03	-81.733	< 2e-16 ***
DewPointTempChange	5.563e-01	7.395e-03	75.219	< 2e-16 ***
WindSpeedChange	5.583e-02	1.267e-02	4.406	1.07e-05 ***
VisibilityChange	-3.258e-04	3.237e-05	-10.067	< 2e-16 ***
SolarRadiationChange	9.422e-01	3.314e-02	28.432	< 2e-16 ***
SnowfallChange	3.459e-01	4.780e-02	7.236	5.03e-13 ***
Hour3Change	-1.459e-01	2.425e-01	-0.602	0.547281
Hour4Change	-4.770e-01	1.974e-01	-2.416	0.015694 *
Hour5Change	-8.021e-01	6.313e-02	-12.705	< 2e-16 ***
Hour6Change	-5.873e-01	2.050e-01	-2.865	0.004185 **
Hour7Change	-3.103e-01	2.412e-01	-1.286	0.198363
Hour8Change	-4.903e-01	2.392e-01	-2.050	0.040431 *
Hour9Change	-6.590e-01	1.818e-01	-3.624	0.000292 ***
Hour10Change	-6.302e-01	1.265e-01	-4.980	6.49e-07 ***
Hour11Change	-2.787e-02	2.225e-01	-0.125	0.900321
Hour13Change	3.708e-01	2.196e-01	1.688	0.091400 .
Hour14Change	8.739e-01	1.260e-01	6.936	4.33e-12 ***
Hour15Change	8.372e-01	1.551e-01	5.399	6.86e-08 ***
Hour16Change	1.502e+00	2.317e-01	6.481	9.63e-11 ***
Hour17Change	1.304e+00	2.468e-01	5.282	1.31e-07 ***
Hour18Change	9.241e-01	2.120e-01	4.359	1.32e-05 ***
Hour19Change	1.077e+00	6.469e-02	16.654	< 2e-16 ***
Hour20Change	7.219e-01	1.919e-01	3.762	0.000170 ***
Hour21Change	7.890e-01	2.374e-01	3.324	0.000892 ***
HumidityChangeXDewPointTempChange	-1.210e-03	1.949e-04	-6.207	5.67e-10 ***
HumidityChangeXSolarRadiationChange	1.385e-02	1.336e-03	10.372	< 2e-16 ***
HumidityChangeXRainfallChange	-2.309e-03	1.055e-03	-2.189	0.028638 *
HumidityChangeXSnowfallChange	-3.226e-03	1.497e-03	-2.155	0.031181 *
DewPointTempChangeXWindSpeedChange	1.516e-02	3.706e-03	4.092	4.32e-05 ***

DewPointTempChangeXRainfallChange	-2.797e-03	5.384e-03	-0.520	0.603401
WindSpeedChangeXSolarRadiationChange	3.335e-02	1.287e-02	2.592	0.009553 **
SolarRadiationChangeXRainfallChange	1.001e-01	2.760e-02	3.628	0.000287 ***
HumidityChangeXHour1Change	-4.553e-02	8.022e-03	-5.676	1.42e-08 ***
HumidityChangeXHour2Change	-2.485e-02	7.005e-03	-3.547	0.000391 ***
HumidityChangeXHour5Change	5.205e-02	4.740e-03	10.981	< 2e-16 ***
HumidityChangeXHour6Change	3.350e-02	6.886e-03	4.865	1.17e-06 ***
HumidityChangeXHour7Change	2.392e-02	7.012e-03	3.411	0.000651 ***
HumidityChangeXHour8Change	4.175e-02	4.490e-03	9.299	< 2e-16 ***
HumidityChangeXHour9Change	4.646e-02	4.567e-03	10.173	< 2e-16 ***
HumidityChangeXHour10Change	1.082e-01	7.011e-03	15.434	< 2e-16 ***
HumidityChangeXHour11Change	3.985e-02	7.151e-03	5.573	2.58e-08 ***
HumidityChangeXHour12Change	2.425e-02	7.385e-03	3.284	0.001027 **
HumidityChangeXHour14Change	-2.517e-03	6.245e-03	-0.403	0.686920
HumidityChangeXHour15Change	2.203e-02	6.149e-03	3.582	0.000342 ***
HumidityChangeXHour16Change	1.512e-03	6.592e-03	0.229	0.818631
HumidityChangeXHour17Change	-2.635e-03	7.120e-03	-0.370	0.711311
HumidityChangeXHour22Change	-2.229e-02	5.628e-03	-3.960	7.54e-05 ***
HumidityChangeXHour23Change	-4.482e-02	5.047e-03	-8.881	< 2e-16 ***
DewPointTempChangeXHour1Change	1.819e-01	3.075e-02	5.915	3.45e-09 ***
DewPointTempChangeXHour10Change	-1.657e-01	2.172e-02	-7.630	2.59e-14 ***
DewPointTempChangeXHour13Change	-2.069e-02	2.004e-02	-1.032	0.302072
DewPointTempChangeXHour14Change	3.977e-02	2.316e-02	1.717	0.086000 .
DewPointTempChangeXHour18Change	-9.000e-02	2.002e-02	-4.496	7.02e-06 ***
DewPointTempChangeXHour19Change	-2.813e-02	1.844e-02	-1.525	0.127229
DewPointTempChangeXHour20Change	4.635e-02	2.414e-02	1.920	0.054892 .
DewPointTempChangeXHour21Change	-5.913e-02	2.261e-02	-2.615	0.008948 **
WindSpeedChangeXHour3Change	7.491e-02	5.064e-02	1.479	0.139084
WindSpeedChangeXHour5Change	1.410e-01	5.637e-02	2.502	0.012383 *
WindSpeedChangeXHour6Change	2.184e-01	5.623e-02	3.885	0.000103 ***
WindSpeedChangeXHour10Change	-1.333e-02	6.320e-02	-0.211	0.832973
WindSpeedChangeXHour11Change	1.395e-02	5.070e-02	0.275	0.783219
WindSpeedChangeXHour15Change	-9.915e-04	5.104e-02	-0.019	0.984501
WindSpeedChangeXHour17Change	-7.733e-02	3.962e-02	-1.952	0.050987 .
WindSpeedChangeXHour18Change	-3.378e-02	3.894e-02	-0.867	0.385758
WindSpeedChangeXHour19Change	-9.556e-02	4.084e-02	-2.340	0.019311 *
VisibilityChangeXHour1Change	-4.035e-04	1.314e-04	-3.072	0.002135 **
VisibilityChangeXHour2Change	-5.890e-04	1.201e-04	-4.903	9.62e-07 ***
VisibilityChangeXHour3Change	-1.107e-04	1.221e-04	-0.907	0.364475
VisibilityChangeXHour8Change	2.620e-04	1.192e-04	2.197	0.028029 *
VisibilityChangeXHour16Change	1.729e-04	1.155e-04	1.497	0.134507
VisibilityChangeXHour17Change	1.186e-04	1.161e-04	1.021	0.307170
VisibilityChangeXHour20Change	-1.651e-05	1.268e-04	-0.130	0.896423

VisibilityChangeXHour23Change	-4.830e-04	1.144e-04	-4.224	2.43e-05	***						
SolarRadiationChangeXHour1Change	5.668e+00	1.878e+00	3.018	0.002553	**						
SolarRadiationChangeXHour2Change	1.020e+00	4.704e-01	2.168	0.030199	*						
SolarRadiationChangeXHour3Change	-5.187e-01	1.640e-01	-3.163	0.001565	**						
SolarRadiationChangeXHour4Change	-8.718e-01	1.146e-01	-7.606	3.13e-14	***						
SolarRadiationChangeXHour5Change	-5.682e-01	1.545e-01	-3.677	0.000237	***						
SolarRadiationChangeXHour7Change	-3.293e-01	1.826e-01	-1.803	0.071372	.						
SolarRadiationChangeXHour10Change	4.937e-01	1.187e-01	4.160	3.21e-05	***						
SolarRadiationChangeXHour11Change	6.972e-01	6.369e-02	10.948	< 2e-16	***						
SolarRadiationChangeXHour12Change	4.408e-01	1.537e-01	2.867	0.004152	**						
SolarRadiationChangeXHour13Change	4.013e-01	5.680e-02	7.064	1.74e-12	***						
SolarRadiationChangeXHour14Change	1.600e-01	5.999e-02	2.667	0.007677	**						
SolarRadiationChangeXHour17Change	-2.006e-01	1.115e-01	-1.798	0.072194	.						
SolarRadiationChangeXHour20Change	-1.049e-01	7.857e-02	-1.336	0.181737							
SolarRadiationChangeXHour23Change	4.416e-01	1.539e-01	2.869	0.004129	**						
RainfallChangeXHour9Change	-1.002e-01	4.014e-02	-2.497	0.012552	*						
RainfallChangeXHour10Change	-1.198e-01	4.557e-02	-2.629	0.008566	**						
RainfallChangeXHour14Change	5.433e-02	5.268e-02	1.031	0.302456							
RainfallChangeXHour20Change	5.106e-02	2.064e-02	2.474	0.013394	*						
RainfallChangeXHour21Change	4.148e-02	2.218e-02	1.870	0.061564	.						
SnowfallChangeXHour8Change	-1.821e-01	1.474e-01	-1.236	0.216591							
SnowfallChangeXHour9Change	-1.226e-01	1.262e-01	-0.971	0.331354							
SnowfallChangeXHour10Change	-2.123e-01	1.039e-01	-2.044	0.041025	*						
SnowfallChangeXHour19Change	3.885e-01	2.390e-01	1.625	0.104134							
Hour1Change	1.969e-01	2.030e-01	0.970	0.332303							
Hour2Change	1.037e-01	2.388e-01	0.434	0.663996							
Hour12Change	3.584e-01	2.466e-01	1.453	0.146183							
Hour22Change	6.960e-01	2.447e-01	2.845	0.004454	**						
Hour23Change	3.593e-01	2.040e-01	1.761	0.078216	.						
RainfallChange	8.095e-03	8.623e-03	0.939	0.347880							
---											
Signif. codes:	0	'***'	0.001	'**'	0.01	'*'	0.05	'. '	0.1	' '	1

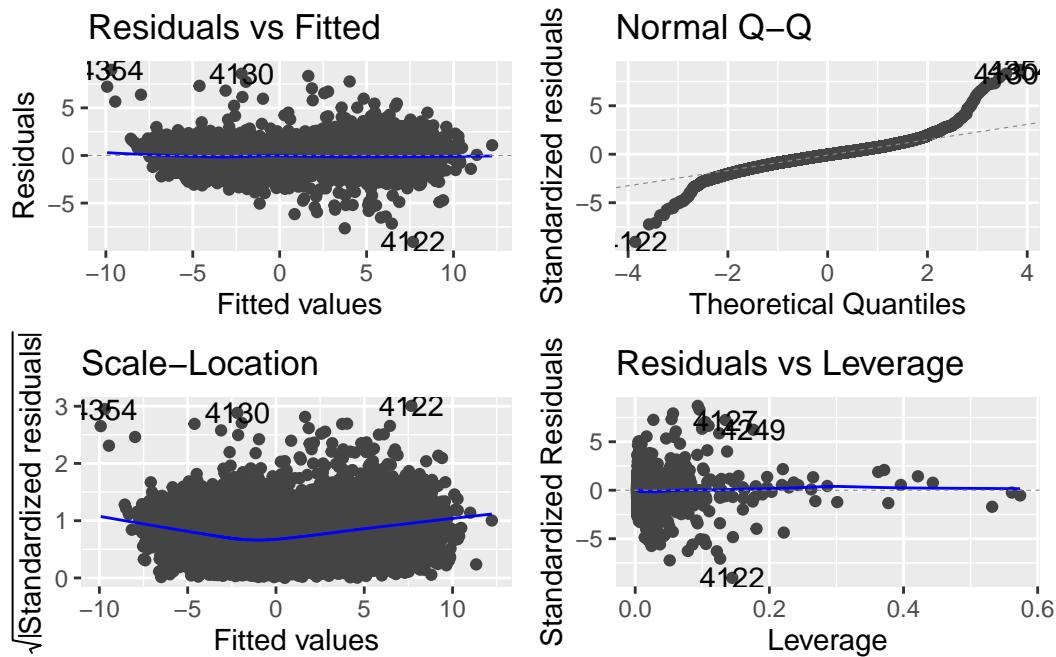
Residual standard error: 1.085 on 8638 degrees of freedom  
 Multiple R-squared: 0.9186, Adjusted R-squared: 0.9177  
 F-statistic: 955.9 on 102 and 8638 DF, p-value: < 2.2e-16

### A.2.1

Model diagnostics for elastic net regression on Model (1) w/ interaction terms

Model assumptions did not drastically improve. QQ-plot indicates that normality assumption is still violated, and is confirmed by a Shapiro-Wilk normality test.

```
autoplot(seoul.elastic)
```



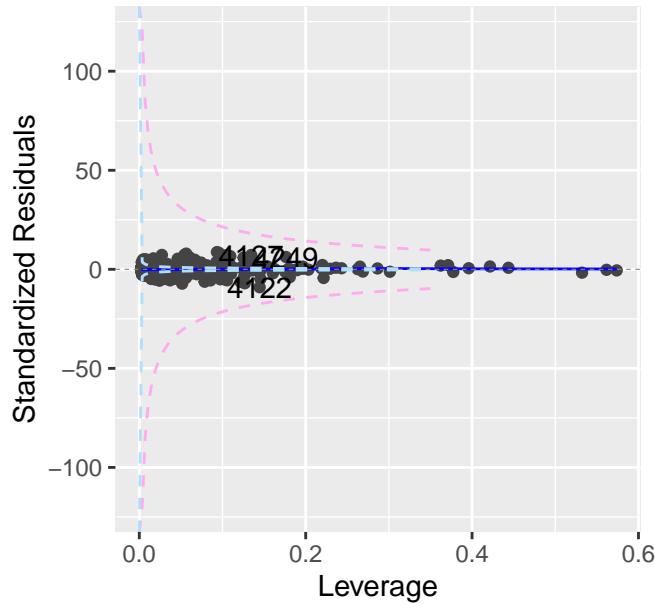
```
shapiro.test(sample(seoul.elastic$residuals, 5000))
```

Shapiro-Wilk normality test

```
data: sample(seoul.elastic$residuals, 5000)
W = 0.93252, p-value < 2.2e-16
```

```
show_leverage(seoul.elastic)
```

### Residuals vs Leverage



### A.3

Transformations we considered for Model (1)

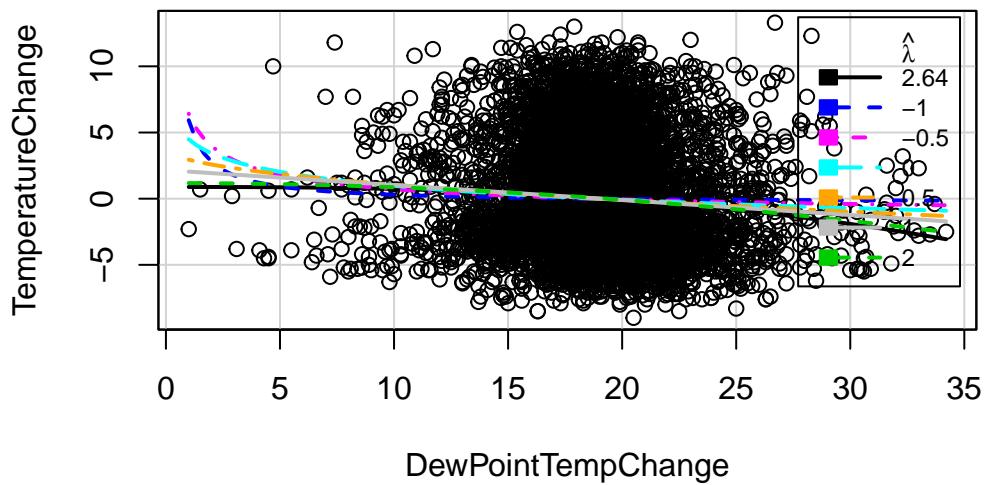
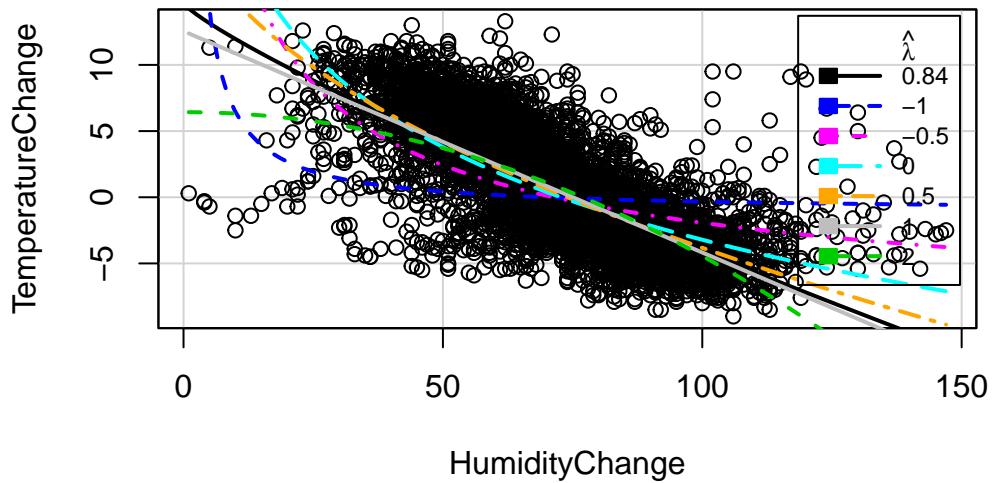
```

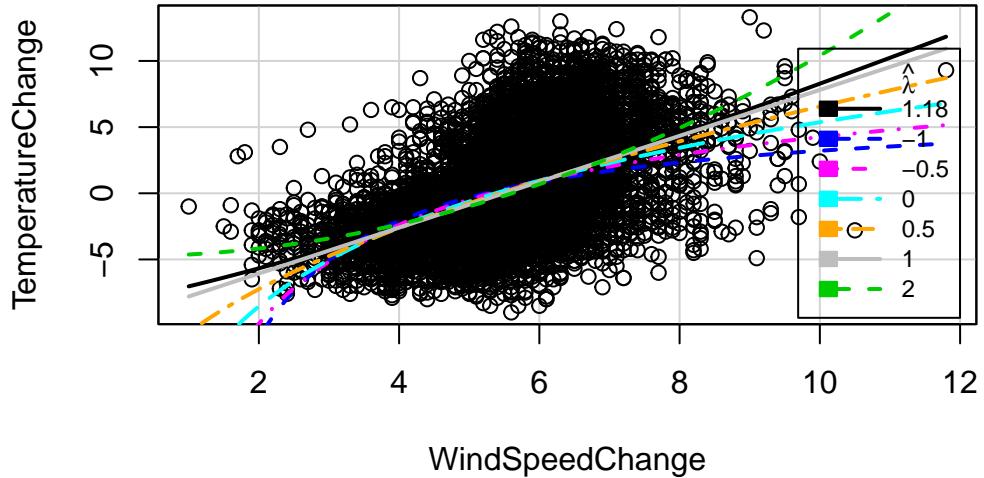
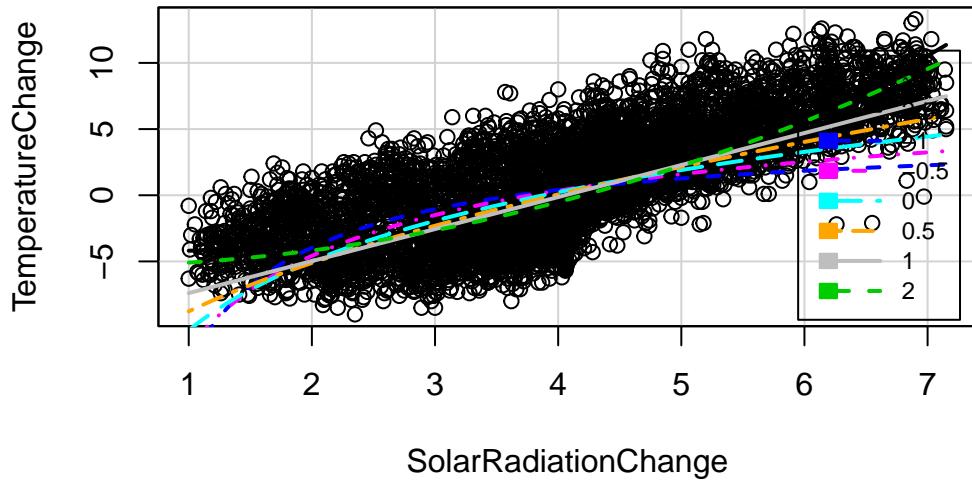
factors.transform = c("HumidityChange", "DewPointTempChange",
                     "SolarRadiationChange", "WindSpeedChange")

t = seoul.temp %>% mutate(
  HumidityChange = HumidityChange + abs(min(HumidityChange)) + 1,
  DewPointTempChange = DewPointTempChange + abs(min(DewPointTempChange)) + 1,
  SolarRadiationChange = SolarRadiationChange + abs(min(SolarRadiationChange)) + 1,
  WindSpeedChange = WindSpeedChange + abs(min(WindSpeedChange)) + 1
)

for(i in 1:length(factors.transform)){
  factor = factors.transform[i]
  invTranPlot(formula(str_c("TemperatureChange ~ ", factor)), data=t,
              lambda = c(-1, -0.5, 0, 0.5, 1, 2), optimal=T)
}

```





#### A.4

An alternative solution to meeting the assumptions for Model (1). In theory,

$$\text{Var}(\eta_{st}|s) = \sigma^2 \quad \forall s \in \text{Seasons}$$

However, if it's the case that

$$\exists \text{ at least one } s \text{ s.t. } \text{Var}(\eta_{st}|s) \neq \sigma^2$$

Then, we could use 4 separate models for each season to completely eliminate  $s$  out of the general  $\eta_{st}$ . Hence, each season will have its own population variance for  $\eta_t$ .

```
create_season_models = function(factors, response, base=F){
  factors = setdiff(factors, response)
  if(base == T){
    f = 0
  } else {
    f = paste(c(0, factors), collapse = " + ")
  }

  models <- map(unique(seoul$Seasons), function(x){
    lm(formula(paste(response, "~", f)),
      data = seoul[seoul$Seasons == x,] %>%
        select(all_of(c(factors, response))))
  })

  names(models) <- str_c("seoul.lm.", unique(seoul$Seasons))
  return(models)
}

models.lm = create_season_models(seoul.change, "TemperatureChange")

create_elastic = function(){
  models = list()
  seasons = seoul$Seasons %>% unique()
  for(s in seasons){
    #print(s)
    seoul.subset = seoul.temp %>% filter(Seasons == s)
    seoul.x = as.matrix(seoul.subset[model.factors])
    seoul.y = as.matrix(seoul.subset["TemperatureChange"])

    elastic_cv <- cv.glmnet(x = seoul.x,
                            y = seoul.y,
                            type.measure = "mse",
                            alpha = 0.5)
  }
}
```

```

d = coef(elastic_cv, s = "lambda.1se")[2:(length(model.factors)-1)]
elastic.factors = model.factors[which(d != 0)]
models[[str_c("seoul.lasso.",s)]] = lm(TemperatureChange ~ 0 + .,
                                         seoul.subset[c("TemperatureChange",
                                         elastic.factors)])
}
return(models)
}
seoul.elastic.models = create_elastic()
for(model in seoul.elastic.models){
  print(summary(model))
  print(autoplot(model))
}

```

Call:

```
lm(formula = TemperatureChange ~ 0 + ., data = seoul.subset[c("TemperatureChange",
  elastic.factors)])
```

Residuals:

Min	1Q	Median	3Q	Max
-3.5454	-0.4905	-0.0350	0.4082	3.8158

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
HumidityChange	-1.845e-01	3.755e-03	-49.132	< 2e-16
DewPointTempChange	7.035e-01	1.244e-02	56.536	< 2e-16
WindSpeedChange	2.721e-02	1.930e-02	1.410	0.158701
VisibilityChange	-6.341e-04	6.658e-05	-9.524	< 2e-16
SolarRadiationChange	9.475e-01	7.422e-02	12.766	< 2e-16
SnowfallChange	3.861e-01	5.566e-02	6.937	5.34e-12
Hour3Change	-2.993e-01	9.113e-02	-3.284	0.001039
Hour4Change	-2.512e-01	9.029e-02	-2.782	0.005446
Hour5Change	-2.661e-01	8.849e-02	-3.007	0.002674
Hour6Change	-2.562e-01	8.653e-02	-2.961	0.003097
Hour7Change	-3.381e-01	8.519e-02	-3.969	7.47e-05
Hour8Change	-5.639e-01	1.233e-01	-4.574	5.06e-06
Hour9Change	-3.487e-01	1.356e-01	-2.572	0.010177
Hour10Change	-3.321e-01	1.261e-01	-2.634	0.008491
Hour13Change	2.461e-01	1.755e-01	1.402	0.161002
Hour14Change	8.356e-01	1.427e-01	5.855	5.54e-09
Hour15Change	1.366e+00	1.377e-01	9.917	< 2e-16

Hour16Change	1.385e+00	1.101e-01	12.582	< 2e-16
Hour17Change	4.765e-01	1.202e-01	3.964	7.62e-05
Hour18Change	5.624e-01	1.100e-01	5.115	3.43e-07
Hour19Change	7.120e-01	9.353e-02	7.612	4.04e-14
Hour20Change	6.104e-01	9.109e-02	6.701	2.65e-11
Hour21Change	5.247e-01	8.928e-02	5.877	4.84e-09
HumidityChangeXDewPointTempChange	-1.085e-03	2.605e-04	-4.164	3.26e-05
DewPointTempChangeXWindSpeedChange	6.379e-03	4.401e-03	1.449	0.147386
DewPointTempChangeXSolarRadiationChange	5.235e-02	9.125e-03	5.737	1.10e-08
DewPointTempChangeXSnowfallChange	5.491e-03	1.373e-02	0.400	0.689352
SolarRadiationChangeXSnowfallChange	3.793e-01	8.365e-02	4.535	6.10e-06
HumidityChangeXHour6Change	-3.567e-03	9.646e-03	-0.370	0.711582
HumidityChangeXHour7Change	2.028e-02	5.858e-03	3.462	0.000547
HumidityChangeXHour8Change	2.492e-02	5.644e-03	4.415	1.06e-05
HumidityChangeXHour9Change	1.774e-02	6.525e-03	2.719	0.006594
HumidityChangeXHour14Change	-7.879e-03	5.507e-03	-1.431	0.152693
HumidityChangeXHour15Change	-1.727e-02	5.590e-03	-3.090	0.002031
HumidityChangeXHour16Change	-2.273e-02	5.905e-03	-3.850	0.000122
DewPointTempChangeXHour5Change	6.674e-02	2.519e-02	2.650	0.008114
DewPointTempChangeXHour6Change	1.054e-01	3.712e-02	2.840	0.004550
DewPointTempChangeXHour20Change	-3.854e-02	2.302e-02	-1.674	0.094245
DewPointTempChangeXHour21Change	-6.607e-02	2.260e-02	-2.924	0.003498
DewPointTempChangeXHour22Change	-3.323e-02	2.233e-02	-1.488	0.136869
DewPointTempChangeXHour23Change	-4.212e-02	2.353e-02	-1.790	0.073648
WindSpeedChangeXHour1Change	1.395e-01	6.689e-02	2.086	0.037133
WindSpeedChangeXHour2Change	8.072e-02	7.060e-02	1.143	0.253003
WindSpeedChangeXHour10Change	-9.327e-02	6.449e-02	-1.446	0.148268
WindSpeedChangeXHour18Change	-9.480e-03	7.278e-02	-0.130	0.896374
WindSpeedChangeXHour19Change	-9.655e-02	5.783e-02	-1.670	0.095132
WindSpeedChangeXHour23Change	7.625e-02	8.346e-02	0.914	0.361026
VisibilityChangeXHour10Change	-6.558e-04	2.024e-04	-3.240	0.001213
VisibilityChangeXHour11Change	-5.967e-04	2.012e-04	-2.966	0.003049
SolarRadiationChangeXhour8Change	2.163e-01	2.663e-01	0.812	0.416807
SolarRadiationChangeXhour9Change	-5.249e-01	1.730e-01	-3.034	0.002441
SolarRadiationChangeXhour11Change	1.080e-01	1.565e-01	0.690	0.489990
SolarRadiationChangeXhour12Change	2.404e-01	1.467e-01	1.639	0.101349
SolarRadiationChangeXhour13Change	4.041e-01	1.550e-01	2.607	0.009208
SolarRadiationChangeXhour16Change	-7.205e-01	1.885e-01	-3.823	0.000136
SolarRadiationChangeXhour17Change	-7.649e-01	2.499e-01	-3.061	0.002232
SolarRadiationChangeXhour22Change	1.054e+00	3.841e-01	2.744	0.006130
SolarRadiationChangeXhour23Change	5.394e+00	1.108e+00	4.867	1.22e-06
RainfallChangeXHour10Change	3.204e-01	1.582e-01	2.025	0.042959
RainfallChangeXHour14Change	3.811e-01	1.232e-01	3.094	0.002001

RainfallChangeXHour16Change	-1.563e-01	9.653e-02	-1.619	0.105666
SnowfallChangeXHour16Change	-8.107e-02	1.311e-01	-0.619	0.536304
HumidityChange	***			
DewPointTempChange	***			
WindSpeedChange				
VisibilityChange	***			
SolarRadiationChange	***			
SnowfallChange	***			
Hour3Change	**			
Hour4Change	**			
Hour5Change	**			
Hour6Change	**			
Hour7Change	***			
Hour8Change	***			
Hour9Change	*			
Hour10Change	**			
Hour13Change				
Hour14Change	***			
Hour15Change	***			
Hour16Change	***			
Hour17Change	***			
Hour18Change	***			
Hour19Change	***			
Hour20Change	***			
Hour21Change	***			
HumidityChangeXDewPointTempChange	***			
DewPointTempChangeXWindSpeedChange				
DewPointTempChangeXSolarRadiationChange	***			
DewPointTempChangeXSnowfallChange				
SolarRadiationChangeXSnowfallChange	***			
HumidityChangeXHour6Change				
HumidityChangeXHour7Change	***			
HumidityChangeXHour8Change	***			
HumidityChangeXHour9Change	**			
HumidityChangeXHour14Change				
HumidityChangeXHour15Change	**			
HumidityChangeXHour16Change	***			
DewPointTempChangeXHour5Change	**			
DewPointTempChangeXHour6Change	**			
DewPointTempChangeXHour20Change	.			
DewPointTempChangeXHour21Change	**			
DewPointTempChangeXHour22Change				

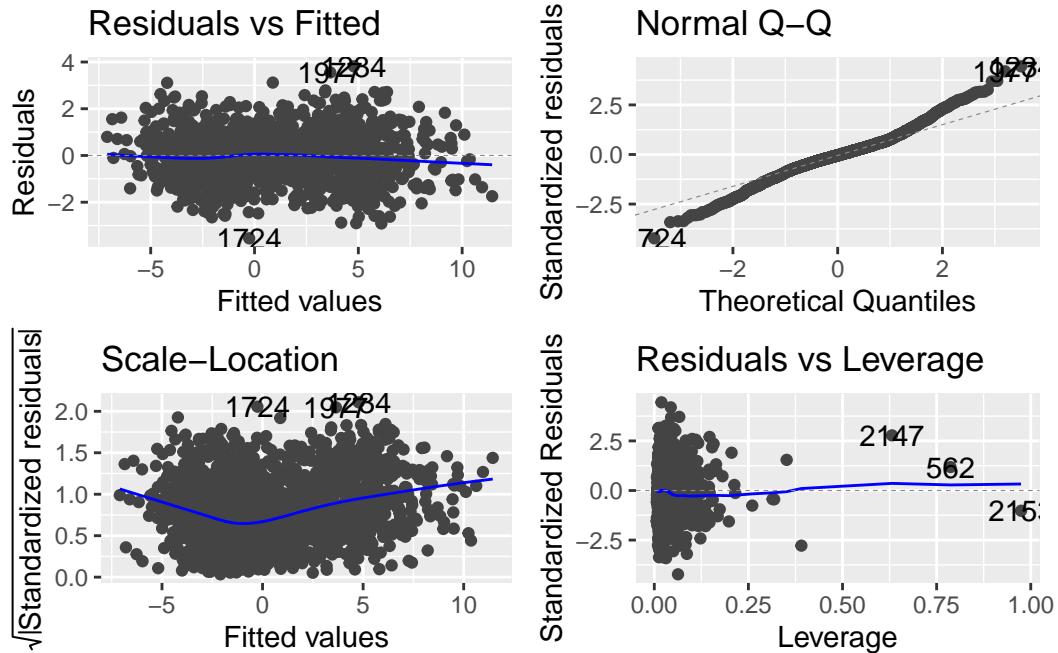
```

DewPointTempChangeXHour23Change      .
WindSpeedChangeXHour1Change        *
WindSpeedChangeXHour2Change
WindSpeedChangeXHour10Change
WindSpeedChangeXHour18Change
WindSpeedChangeXHour19Change      .
WindSpeedChangeXHour23Change
VisibilityChangeXHour10Change     **
VisibilityChangeXHour11Change     **
SolarRadiationChangeXHour8Change
SolarRadiationChangeXHour9Change     **
SolarRadiationChangeXHour11Change
SolarRadiationChangeXHour12Change
SolarRadiationChangeXHour13Change     **
SolarRadiationChangeXHour16Change     ***
SolarRadiationChangeXHour17Change     **
SolarRadiationChangeXHour22Change     **
SolarRadiationChangeXHour23Change     ***
RainfallChangeXHour10Change       *
RainfallChangeXHour14Change       **
RainfallChangeXHour16Change
SnowfallChangeXHour16Change

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8667 on 2093 degrees of freedom
Multiple R-squared:  0.9293,    Adjusted R-squared:  0.9272
F-statistic: 443.8 on 62 and 2093 DF,  p-value: < 2.2e-16

```



Call:

```
lm(formula = TemperatureChange ~ 0 + ., data = seoul.subset[c("TemperatureChange",
  elastic.factors)])
```

Residuals:

Min	1Q	Median	3Q	Max
-7.0929	-0.8415	-0.0430	0.6865	6.8884

Coefficients:

HumidityChange
DewPointTempChange
WindSpeedChange
SolarRadiationChange
Hour3Change
Hour4Change
Hour5Change
Hour6Change
Hour7Change
Hour8Change
Hour9Change
Hour10Change

	Estimate	Std. Error	t value	Pr(> t )
-0.0950599	0.0033957	-27.995	< 2e-16	
0.3474562	0.0140465	24.736	< 2e-16	
0.1026548	0.0308426	3.328	0.000888	
1.4523932	0.0658378	22.060	< 2e-16	
-1.3100475	0.1372640	-9.544	< 2e-16	
-1.2545078	0.1382924	-9.071	< 2e-16	
-1.1925394	0.1326945	-8.987	< 2e-16	
-0.7522803	0.1338382	-5.621	2.15e-08	
-0.3696245	0.1632513	-2.264	0.023665	
-1.4016532	0.1769396	-7.922	3.73e-15	
-1.2736711	0.2463375	-5.170	2.55e-07	
-1.1428761	0.2364303	-4.834	1.43e-06	

Hour14Change	0.6158163	0.2324471	2.649	0.008126
Hour15Change	0.5960603	0.2150324	2.772	0.005620
Hour16Change	1.8743921	0.1407839	13.314	< 2e-16
Hour17Change	0.6728531	0.1974417	3.408	0.000667
Hour18Change	0.4147663	0.2081226	1.993	0.046400
Hour19Change	1.4200139	0.1673271	8.486	< 2e-16
Hour20Change	0.9774002	0.1550642	6.303	3.53e-10
Hour21Change	1.1668797	0.1389687	8.397	< 2e-16
HumidityChangeXDewPointTempChange	-0.0019481	0.0004614	-4.222	2.52e-05
HumidityChangeXSolarRadiationChange	0.0189528	0.0025540	7.421	1.67e-13
HumidityChangeXRainfallChange	-0.0085685	0.0027563	-3.109	0.001903
DewPointTempChangeXWindSpeedChange	0.0140333	0.0082130	1.709	0.087655
DewPointTempChangeXSolarRadiationChange	-0.0472003	0.0116693	-4.045	5.42e-05
DewPointTempChangeXRainfallChange	-0.0301455	0.0122513	-2.461	0.013949
WindSpeedChangeXSolarRadiationChange	0.0571150	0.0260207	2.195	0.028271
SolarRadiationChangeXRainfallChange	0.1430398	0.0699532	2.045	0.040997
HumidityChangeXHour1Change	-0.0376430	0.0079965	-4.707	2.67e-06
HumidityChangeXHour2Change	-0.0212459	0.0074997	-2.833	0.004656
HumidityChangeXHour5Change	0.0426347	0.0074157	5.749	1.02e-08
HumidityChangeXHour8Change	0.0274864	0.0082470	3.333	0.000874
HumidityChangeXHour9Change	0.0392869	0.0072826	5.395	7.62e-08
HumidityChangeXHour10Change	0.0781468	0.0097853	7.986	2.25e-15
HumidityChangeXHour11Change	0.0322294	0.0087037	3.703	0.000218
HumidityChangeXHour12Change	0.0282562	0.0077773	3.633	0.000287
HumidityChangeXHour16Change	-0.0098018	0.0084918	-1.154	0.248520
HumidityChangeXHour22Change	-0.0234573	0.0080808	-2.903	0.003736
HumidityChangeXHour23Change	-0.0310661	0.0075903	-4.093	4.42e-05
DewPointTempChangeXHour10Change	-0.1832465	0.0422203	-4.340	1.49e-05
DewPointTempChangeXHour13Change	0.0628467	0.0354232	1.774	0.076178
DewPointTempChangeXHour14Change	0.1185575	0.0341265	3.474	0.000523
WindSpeedChangeXHour14Change	-0.1191571	0.1183081	-1.007	0.313963
WindSpeedChangeXHour15Change	0.0459108	0.0963252	0.477	0.633679
WindSpeedChangeXHour16Change	0.0345058	0.0866628	0.398	0.690551
WindSpeedChangeXHour19Change	-0.3392729	0.1144444	-2.965	0.003065
SolarRadiationChangeXHour1Change	18.4895175	6.1706334	2.996	0.002763
SolarRadiationChangeXHour2Change	3.0543660	0.9498644	3.216	0.001321
SolarRadiationChangeXHour4Change	-1.0158852	0.2397416	-4.237	2.36e-05
SolarRadiationChangeXHour5Change	-1.0734593	0.1726596	-6.217	6.06e-10
SolarRadiationChangeXHour7Change	-0.1818681	0.2840311	-0.640	0.522039
SolarRadiationChangeXHour11Change	1.0668488	0.1205722	8.848	< 2e-16
SolarRadiationChangeXHour12Change	1.2166045	0.2288282	5.317	1.17e-07
SolarRadiationChangeXHour13Change	0.4705399	0.1671183	2.816	0.004913
SolarRadiationChangeXHour14Change	0.3144008	0.1111693	2.828	0.004726

SolarRadiationChangeXHour17Change	-0.2713219	0.2220101	-1.222	0.221798
SolarRadiationChangeXHour18Change	-0.5285667	0.2385519	-2.216	0.026815
SolarRadiationChangeXHour23Change	0.9991105	0.3836220	2.604	0.009267
HumidityChange	***			
DewPointTempChange	***			
WindSpeedChange	***			
SolarRadiationChange	***			
Hour3Change	***			
Hour4Change	***			
Hour5Change	***			
Hour6Change	***			
Hour7Change	*			
Hour8Change	***			
Hour9Change	***			
Hour10Change	***			
Hour14Change	**			
Hour15Change	**			
Hour16Change	***			
Hour17Change	***			
Hour18Change	*			
Hour19Change	***			
Hour20Change	***			
Hour21Change	***			
HumidityChangeXDewPointTempChange	***			
HumidityChangeXSolarRadiationChange	***			
HumidityChangeXRainfallChange	**			
DewPointTempChangeXWindSpeedChange	.			
DewPointTempChangeXSolarRadiationChange	***			
DewPointTempChangeXRainfallChange	*			
WindSpeedChangeXSolarRadiationChange	*			
SolarRadiationChangeXRainfallChange	*			
HumidityChangeXHour1Change	***			
HumidityChangeXHour2Change	**			
HumidityChangeXHour5Change	***			
HumidityChangeXHour8Change	***			
HumidityChangeXHour9Change	***			
HumidityChangeXHour10Change	***			
HumidityChangeXHour11Change	***			
HumidityChangeXHour12Change	***			
HumidityChangeXHour16Change				
HumidityChangeXHour22Change	**			
HumidityChangeXHour23Change	***			

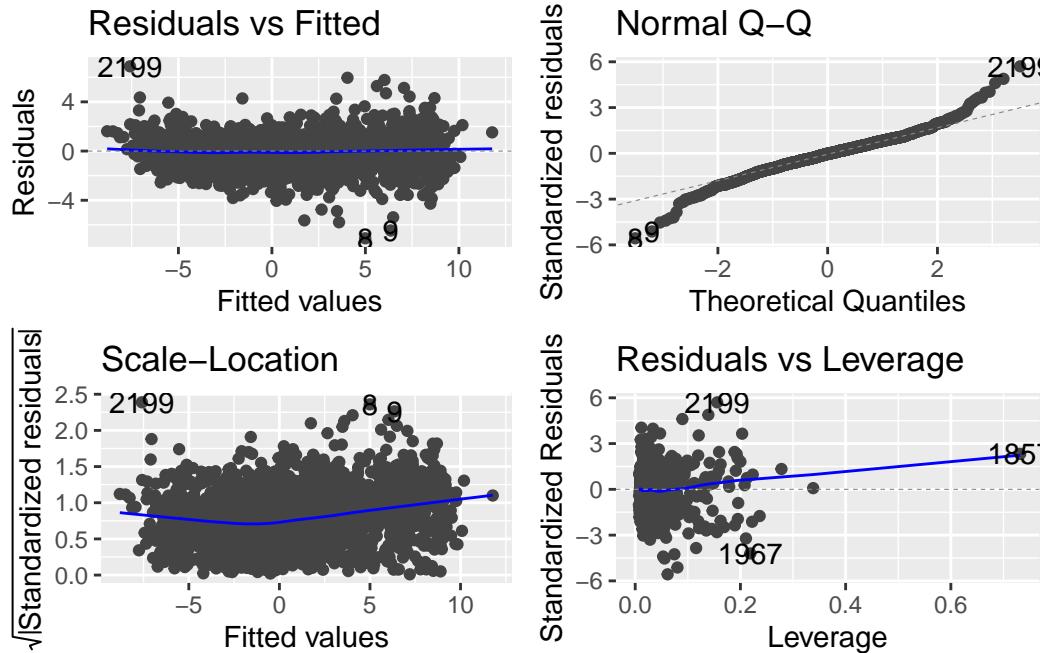
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DewPointTempChangeXHour10Change      ***
DewPointTempChangeXHour13Change      .
DewPointTempChangeXHour14Change      ***
WindSpeedChangeXHour14Change
WindSpeedChangeXHour15Change
WindSpeedChangeXHour16Change
WindSpeedChangeXHour19Change      **
SolarRadiationChangeXHour1Change   **
SolarRadiationChangeXHour2Change   **
SolarRadiationChangeXHour4Change   ***
SolarRadiationChangeXHour5Change   ***
SolarRadiationChangeXHour7Change
SolarRadiationChangeXHour11Change  ***
SolarRadiationChangeXHour12Change  ***
SolarRadiationChangeXHour13Change  **
SolarRadiationChangeXHour14Change  **
SolarRadiationChangeXHour17Change
SolarRadiationChangeXHour18Change  *
SolarRadiationChangeXHour23Change  **

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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 1.315 on 2145 degrees of freedom  
Multiple R-squared: 0.904, Adjusted R-squared: 0.9014  
F-statistic: 348.3 on 58 and 2145 DF, p-value: < 2.2e-16



Call:

```
lm(formula = TemperatureChange ~ 0 + ., data = seoul.subset[c("TemperatureChange",
  elastic.factors)])
```

Residuals:

Min	1Q	Median	3Q	Max
-2.9304	-0.3410	0.0398	0.3865	3.8907

Coefficients: (1 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t )
HumidityChange	-2.165e-01	3.242e-03	-66.787	< 2e-16
DewPointTempChange	7.348e-01	1.599e-02	45.952	< 2e-16
VisibilityChange	-3.651e-04	4.321e-05	-8.450	< 2e-16
SolarRadiationChange	6.186e-01	3.844e-02	16.090	< 2e-16
RainfallChange	2.351e-02	8.752e-03	2.686	0.007281
Hour4Change	-3.052e-01	7.217e-02	-4.230	2.44e-05
Hour5Change	-1.370e-02	8.391e-02	-0.163	0.870270
Hour6Change	-1.706e-01	9.404e-02	-1.814	0.069778
Hour8Change	-2.158e-01	1.198e-01	-1.801	0.071797
Hour9Change	-6.276e-01	1.323e-01	-4.743	2.24e-06
Hour10Change	-5.088e-01	1.615e-01	-3.150	0.001657
Hour11Change	-4.286e-01	1.584e-01	-2.705	0.006876

Hour12Change	-4.796e-01	1.567e-01	-3.060	0.002242
Hour14Change	2.560e-01	1.163e-01	2.201	0.027876
Hour15Change	5.817e-01	1.540e-01	3.777	0.000163
Hour16Change	2.838e-01	1.446e-01	1.963	0.049787
Hour17Change	9.441e-02	1.554e-01	0.608	0.543523
Hour18Change	3.245e-01	1.190e-01	2.727	0.006451
Hour19Change	6.520e-01	8.367e-02	7.793	1.01e-14
Hour20Change	4.756e-01	1.275e-01	3.731	0.000195
Hour21Change	2.579e-01	1.005e-01	2.565	0.010381
Hour22Change	1.059e-01	9.238e-02	1.146	0.251898
HumidityChangeXDewPointTempChange	-2.672e-03	7.583e-04	-3.523	0.000436
DewPointTempChangeXVisibilityChange	-1.220e-04	2.477e-05	-4.924	9.12e-07
WindSpeedChangeXRainfallChange	-7.604e-03	6.162e-03	-1.234	0.217308
VisibilityChangeXSolarRadiationChange	-5.616e-05	4.645e-05	-1.209	0.226708
SolarRadiationChangeXRainfallChange	9.048e-02	1.900e-02	4.762	2.04e-06
HumidityChangeXHour1Change	-8.764e-03	9.199e-03	-0.953	0.340866
HumidityChangeXHour2Change	-1.831e-02	7.967e-03	-2.299	0.021622
HumidityChangeXHour3Change	-2.911e-02	7.640e-03	-3.811	0.000143
HumidityChangeXHour5Change	-4.594e-02	9.106e-03	-5.045	4.93e-07
HumidityChangeXHour9Change	5.797e-03	8.940e-03	0.648	0.516789
HumidityChangeXHour10Change	1.593e-02	8.493e-03	1.876	0.060801
HumidityChangeXHour11Change	1.965e-02	1.142e-02	1.720	0.085515
HumidityChangeXHour16Change	-2.434e-02	9.620e-03	-2.530	0.011483
HumidityChangeXHour17Change	-4.009e-02	8.271e-03	-4.847	1.34e-06
DewPointTempChangeXHour5Change	4.092e-01	5.166e-02	7.920	3.80e-15
DewPointTempChangeXHour6Change	1.655e-01	5.777e-02	2.864	0.004218
DewPointTempChangeXHour9Change	1.406e-01	5.727e-02	2.454	0.014188
DewPointTempChangeXHour11Change	6.069e-02	5.491e-02	1.105	0.269138
DewPointTempChangeXHour12Change	6.356e-02	3.889e-02	1.634	0.102303
DewPointTempChangeXHour15Change	-1.783e-01	4.459e-02	-3.998	6.61e-05
DewPointTempChangeXHour18Change	-9.540e-02	4.064e-02	-2.348	0.018986
DewPointTempChangeXHour20Change	-1.424e-01	4.382e-02	-3.251	0.001170
DewPointTempChangeXHour21Change	-1.114e-01	4.098e-02	-2.719	0.006606
DewPointTempChangeXHour22Change	-1.246e-01	4.002e-02	-3.113	0.001874
DewPointTempChangeXHour23Change	-8.268e-02	4.320e-02	-1.914	0.055765
WindSpeedChangeXHour5Change	-1.701e-02	7.467e-02	-0.228	0.819879
WindSpeedChangeXHour10Change	-6.177e-02	7.529e-02	-0.820	0.412044
WindSpeedChangeXHour11Change	-9.777e-02	8.530e-02	-1.146	0.251884
WindSpeedChangeXHour16Change	8.070e-03	6.657e-02	0.121	0.903518
WindSpeedChangeXHour19Change	-3.683e-02	5.492e-02	-0.671	0.502497
WindSpeedChangeXHour20Change	-6.338e-02	6.083e-02	-1.042	0.297575
VisibilityChangeXHour6Change	3.218e-04	1.716e-04	1.875	0.060917
VisibilityChangeXHour11Change	5.658e-05	1.824e-04	0.310	0.756462

VisibilityChangeXHour12Change	7.444e-05	1.624e-04	0.459	0.646635
VisibilityChangeXHour13Change	4.477e-05	1.532e-04	0.292	0.770148
VisibilityChangeXHour17Change	2.022e-04	1.790e-04	1.130	0.258708
VisibilityChangeXHour18Change	2.997e-04	1.566e-04	1.914	0.055761
SolarRadiationChangeXHour1Change	-2.436e-01	1.798e+00	-0.135	0.892260
SolarRadiationChangeXHour2Change	8.020e-01	3.728e-01	2.151	0.031589
SolarRadiationChangeXHour7Change	-8.142e-01	2.175e-01	-3.744	0.000186
SolarRadiationChangeXHour8Change	-1.707e-01	2.021e-01	-0.845	0.398417
SolarRadiationChangeXHour10Change	5.610e-01	9.836e-02	5.704	1.33e-08
SolarRadiationChangeXHour11Change	2.972e-01	9.503e-02	3.127	0.001788
SolarRadiationChangeXHour12Change	-4.109e-01	1.616e-01	-2.543	0.011075
SolarRadiationChangeXHour13Change	1.408e-01	1.799e-01	0.783	0.433943
SolarRadiationChangeXHour16Change	-3.429e-01	8.870e-02	-3.866	0.000114
SolarRadiationChangeXHour17Change	-9.053e-01	1.341e-01	-6.750	1.91e-11
SolarRadiationChangeXHour18Change	-2.058e-01	2.112e-01	-0.974	0.329924
SolarRadiationChangeXHour22Change	NA	NA	NA	NA
SolarRadiationChangeXHour23Change	4.137e-01	2.517e-01	1.643	0.100471
RainfallChangeXHour5Change	-3.222e-02	4.760e-02	-0.677	0.498610
RainfallChangeXHour9Change	-9.460e-02	4.976e-02	-1.901	0.057424
RainfallChangeXHour20Change	4.445e-02	1.521e-02	2.923	0.003499
RainfallChangeXHour23Change	-3.659e-02	2.594e-02	-1.410	0.158547
HumidityChange	***			
DewPointTempChange	***			
VisibilityChange	***			
SolarRadiationChange	***			
RainfallChange	**			
Hour4Change	***			
Hour5Change				
Hour6Change	.			
Hour8Change	.			
Hour9Change	***			
Hour10Change	**			
Hour11Change	**			
Hour12Change	**			
Hour14Change	*			
Hour15Change	***			
Hour16Change	*			
Hour17Change				
Hour18Change	**			
Hour19Change	***			
Hour20Change	***			
Hour21Change	*			

Hour22Change	
HumidityChangexDewPointTempChange	***
DewPointTempChangeXVisibilityChange	***
WindSpeedChangeXRainfallChange	
VisibilityChangeXSolarRadiationChange	
SolarRadiationChangeXRainfallChange	***
HumidityChangeXHour1Change	
HumidityChangeXHour2Change	*
HumidityChangeXHour3Change	***
HumidityChangeXHour5Change	***
HumidityChangeXHour9Change	
HumidityChangeXHour10Change	.
HumidityChangeXHour11Change	.
HumidityChangeXHour16Change	*
HumidityChangeXHour17Change	***
DewPointTempChangeXHour5Change	***
DewPointTempChangeXHour6Change	**
DewPointTempChangeXHour9Change	*
DewPointTempChangeXHour11Change	
DewPointTempChangeXHour12Change	
DewPointTempChangeXHour15Change	***
DewPointTempChangeXHour18Change	*
DewPointTempChangeXHour20Change	**
DewPointTempChangeXHour21Change	**
DewPointTempChangeXHour22Change	**
DewPointTempChangeXHour23Change	.
WindSpeedChangeXHour5Change	
WindSpeedChangeXHour10Change	
WindSpeedChangeXHour11Change	
WindSpeedChangeXHour16Change	
WindSpeedChangeXHour19Change	
WindSpeedChangeXHour20Change	
VisibilityChangeXHour6Change	.
VisibilityChangeXHour11Change	
VisibilityChangeXHour12Change	
VisibilityChangeXHour13Change	
VisibilityChangeXHour17Change	
VisibilityChangeXHour18Change	.
SolarRadiationChangeXHour1Change	
SolarRadiationChangeXHour2Change	*
SolarRadiationChangeXHour7Change	***
SolarRadiationChangeXHour8Change	
SolarRadiationChangeXHour10Change	***

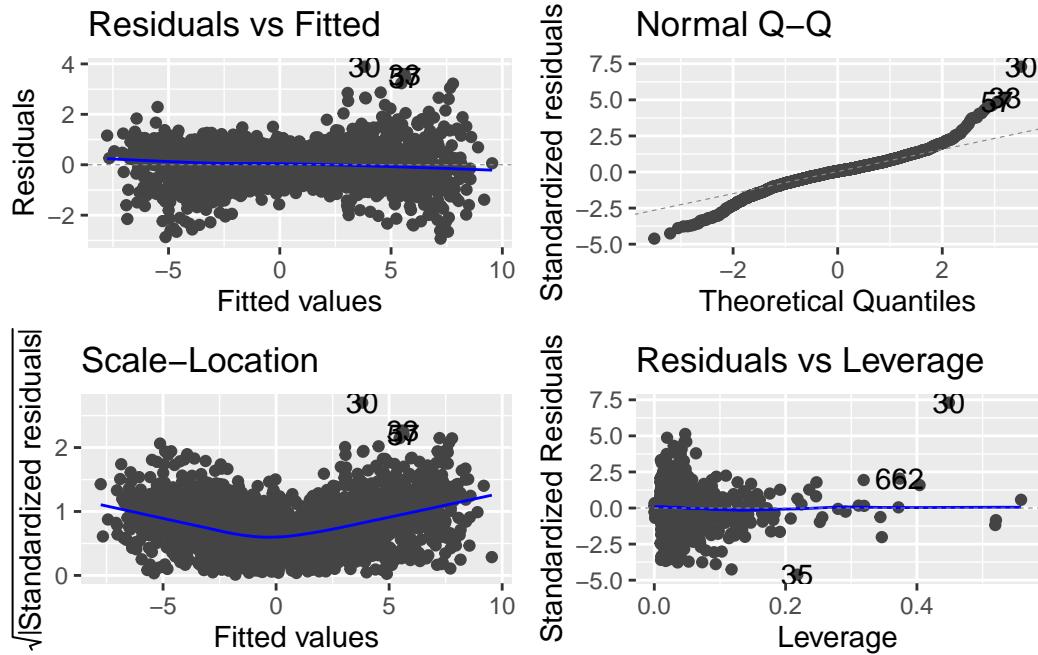
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SolarRadiationChangeXHour11Change      **
SolarRadiationChangeXHour12Change       *
SolarRadiationChangeXHour13Change
SolarRadiationChangeXHour16Change      ***
SolarRadiationChangeXHour17Change      ***
SolarRadiationChangeXHour18Change
SolarRadiationChangeXHour22Change
SolarRadiationChangeXHour23Change
RainfallChangeXHour5Change
RainfallChangeXHour9Change
RainfallChangeXHour20Change          .
RainfallChangeXHour23Change          **

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.7176 on 2128 degrees of freedom  
 Multiple R-squared: 0.9623, Adjusted R-squared: 0.961  
 F-statistic: 725.1 on 75 and 2128 DF, p-value: < 2.2e-16



```

Call:
lm(formula = TemperatureChange ~ 0 + ., data = seoul.subset[c("TemperatureChange",

```

elastic.factors)])

Residuals:

Min	1Q	Median	3Q	Max
-6.1039	-0.4911	-0.0930	0.3416	5.5883

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
HumidityChange	-2.133e-01	2.886e-03	-73.923	< 2e-16
DewPointTempChange	7.461e-01	1.195e-02	62.438	< 2e-16
WindSpeedChange	4.401e-03	2.018e-02	0.218	0.827409
VisibilityChange	-4.070e-04	5.723e-05	-7.112	1.56e-12
SolarRadiationChange	5.635e-01	3.876e-02	14.536	< 2e-16
RainfallChange	4.905e-02	1.525e-02	3.217	0.001313
Hour5Change	-1.735e-01	7.573e-02	-2.291	0.022061
Hour14Change	8.351e-01	1.144e-01	7.301	4.01e-13
Hour15Change	1.336e+00	9.386e-02	14.234	< 2e-16
Hour16Change	1.054e+00	1.184e-01	8.903	< 2e-16
Hour17Change	5.162e-01	1.025e-01	5.034	5.20e-07
Hour18Change	4.032e-01	1.172e-01	3.439	0.000594
Hour19Change	6.106e-01	9.160e-02	6.666	3.33e-11
Hour20Change	4.229e-01	9.019e-02	4.689	2.92e-06
Hour21Change	4.359e-01	8.157e-02	5.344	1.01e-07
DewPointTempChangeXSolarRadiationChange	3.752e-02	8.865e-03	4.232	2.41e-05
VisibilityChangeXSolarRadiationChange	-1.637e-04	6.022e-05	-2.719	0.006606
SolarRadiationChangeXRainfallChange	1.502e-01	3.783e-02	3.969	7.46e-05
SolarRadiationChangeXSnowfallChange	6.021e-01	1.222e-01	4.929	8.89e-07
HumidityChangeXHour8Change	1.692e-02	5.693e-03	2.972	0.002993
HumidityChangeXHour9Change	5.233e-02	9.141e-03	5.725	1.18e-08
HumidityChangeXHour10Change	2.375e-02	4.820e-03	4.927	9.00e-07
HumidityChangeXHour14Change	-3.361e-03	6.734e-03	-0.499	0.617691
HumidityChangeXHour15Change	-1.497e-02	5.691e-03	-2.631	0.008585
HumidityChangeXHour23Change	-8.620e-03	6.571e-03	-1.312	0.189751
DewPointTempChangeXHour4Change	9.421e-02	4.000e-02	2.355	0.018591
DewPointTempChangeXHour11Change	6.277e-02	2.496e-02	2.515	0.011984
DewPointTempChangeXHour18Change	-1.334e-01	2.816e-02	-4.736	2.32e-06
DewPointTempChangeXHour19Change	-9.916e-02	2.956e-02	-3.354	0.000810
DewPointTempChangeXHour20Change	-1.280e-01	2.746e-02	-4.660	3.35e-06
DewPointTempChangeXHour21Change	-6.125e-02	2.373e-02	-2.582	0.009900
DewPointTempChangeXHour22Change	-6.443e-02	2.474e-02	-2.604	0.009271
WindSpeedChangeXHour14Change	2.322e-02	6.830e-02	0.340	0.733917
WindSpeedChangeXHour15Change	7.567e-02	5.955e-02	1.271	0.203961
VisibilityChangeXHour10Change	-4.860e-05	1.529e-04	-0.318	0.750658

VisibilityChangeXHour11Change	-2.321e-04	1.678e-04	-1.384	0.166634
SolarRadiationChangeXHour8Change	-6.134e-01	1.318e-01	-4.653	3.47e-06
SolarRadiationChangeXHour9Change	-4.683e-02	1.240e-01	-0.378	0.705658
SolarRadiationChangeXHour11Change	1.940e-01	5.625e-02	3.449	0.000573
SolarRadiationChangeXHour12Change	3.743e-01	4.944e-02	7.572	5.44e-14
SolarRadiationChangeXHour13Change	-5.347e-03	8.105e-02	-0.066	0.947403
SolarRadiationChangeXHour16Change	-4.612e-01	1.212e-01	-3.805	0.000146
SolarRadiationChangeXHour22Change	9.259e-01	1.975e-01	4.689	2.92e-06
SolarRadiationChangeXHour23Change	1.452e+00	4.383e-01	3.312	0.000940
RainfallChangeXHour9Change	-1.422e-01	5.973e-02	-2.381	0.017366
RainfallChangeXHour20Change	-2.440e-01	8.704e-02	-2.803	0.005103
HumidityChange	***			
DewPointTempChange	***			
WindSpeedChange				
VisibilityChange	***			
SolarRadiationChange	***			
RainfallChange	**			
Hour5Change	*			
Hour14Change	***			
Hour15Change	***			
Hour16Change	***			
Hour17Change	***			
Hour18Change	***			
Hour19Change	***			
Hour20Change	***			
Hour21Change	***			
DewPointTempChangeXSolarRadiationChange	***			
VisibilityChangeXSolarRadiationChange	**			
SolarRadiationChangeXRainfallChange	***			
SolarRadiationChangeXSnowfallChange	***			
HumidityChangeXHour8Change	**			
HumidityChangeXHour9Change	***			
HumidityChangeXHour10Change	***			
HumidityChangeXHour14Change				
HumidityChangeXHour15Change	**			
HumidityChangeXHour23Change				
DewPointTempChangeXHour4Change	*			
DewPointTempChangeXHour11Change	*			
DewPointTempChangeXHour18Change	***			
DewPointTempChangeXHour19Change	***			
DewPointTempChangeXHour20Change	***			
DewPointTempChangeXHour21Change	**			

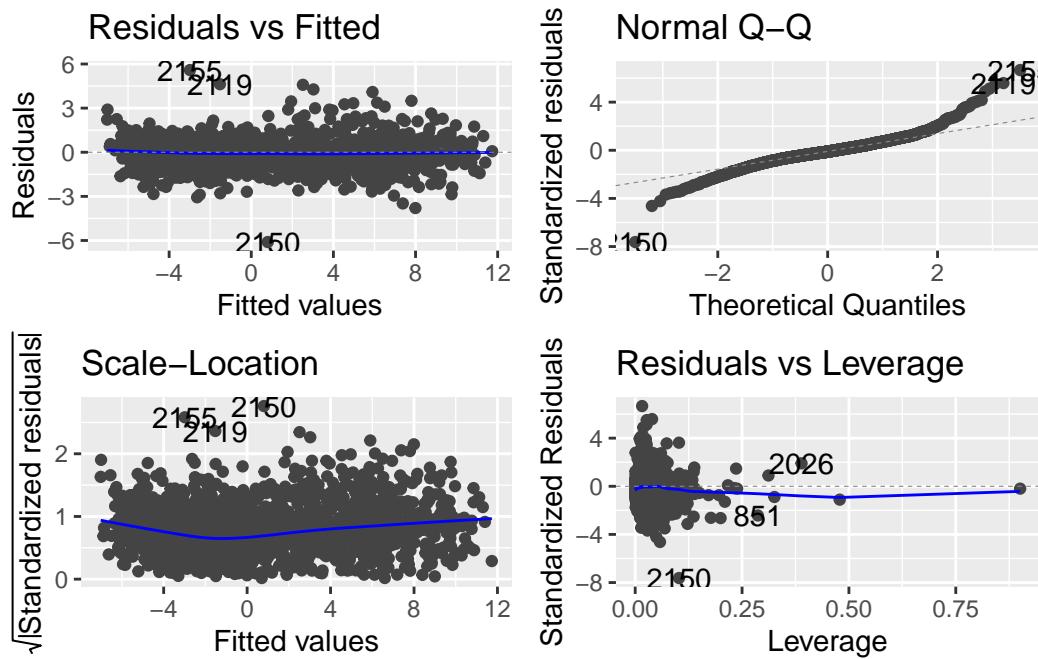
```

DewPointTempChangeXHour22Change      **
WindSpeedChangeXHour14Change
WindSpeedChangeXHour15Change
VisibilityChangeXHour10Change
VisibilityChangeXHour11Change
SolarRadiationChangeXHour8Change    ***
SolarRadiationChangeXHour9Change
SolarRadiationChangeXHour11Change   ***
SolarRadiationChangeXHour12Change   ***
SolarRadiationChangeXHour13Change
SolarRadiationChangeXHour16Change   ***
SolarRadiationChangeXHour22Change   ***
SolarRadiationChangeXHour23Change   ***
RainfallChangeXHour9Change        *
RainfallChangeXHour20Change       **

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.8451 on 2133 degrees of freedom  
 Multiple R-squared: 0.9565, Adjusted R-squared: 0.9556  
 F-statistic: 1020 on 46 and 2133 DF, p-value: < 2.2e-16



## A.5

Most assailant factors in Model (2) (hour changes excluded)

```

elastic.coef = tibble(
  Factor = names(seoul.elastic$coefficients),
  Coefficient = seoul.elastic$coefficients,
  P.Value = summary(seoul.elastic)$coefficients[, "Pr(>|t|)"] %>% round(5) %>%
    format(scientific=F)
) %>% arrange(abs(Coefficient)) %>% desc()

elastic.coef$Rank = 1:nrow(elastic.coef)

elastic.coef %>%
  filter(!(Factor %in% str_c(time.bike, "Change"))) %>%
  knitr::kable()

```

Factor	Coefficient	P.Value	Rank
SolarRadiationChangeXHour1Change	5.6676655	0.00255	1
SolarRadiationChangeXHour2Change	1.0197500	0.03020	5
SolarRadiationChange	0.9421576	0.00000	6
SolarRadiationChangeXHour4Change	-0.8718175	0.00000	9
SolarRadiationChangeXHour11Change	0.6972467	0.00000	14
SolarRadiationChangeXHour5Change	-0.5682327	0.00024	19
DewPointTempChange	0.5562774	0.00000	20
SolarRadiationChangeXHour3Change	-0.5186623	0.00156	21
SolarRadiationChangeXHour10Change	0.4937060	0.00003	22
SolarRadiationChangeXHour23Change	0.4416280	0.00413	25
SolarRadiationChangeXHour12Change	0.4407690	0.00415	26
SolarRadiationChangeXHour13Change	0.4012680	0.00000	27
SnowfallChangeXHour19Change	0.3885149	0.10413	28
SnowfallChange	0.3458517	0.00000	32
SolarRadiationChangeXHour7Change	-0.3292517	0.07137	33
WindSpeedChangeXHour6Change	0.2184351	0.00010	35
SnowfallChangeXHour10Change	-0.2123441	0.04102	36
SolarRadiationChangeXHour17Change	-0.2005784	0.07219	37
SnowfallChangeXHour8Change	-0.1821063	0.21659	39
DewPointTempChangeXHour1Change	0.1818684	0.00000	40
DewPointTempChangeXHour10Change	-0.1657077	0.00000	41
SolarRadiationChangeXHour14Change	0.1599576	0.00768	42
HumidityChange	-0.1513958	0.00000	43
WindSpeedChangeXHour5Change	0.1410134	0.01238	45

Factor	Coefficient	P.Value	Rank
SnowfallChangeXHour9Change	-0.1226283	0.33135	46
RainfallChangeXHour10Change	-0.1198185	0.00857	47
HumidityChangeXHour10Change	0.1082093	0.00000	48
SolarRadiationChangeXHour20Change	-0.1049370	0.18174	49
RainfallChangeXHour9Change	-0.1002287	0.01255	51
SolarRadiationChangeXRainfallChange	0.1001200	0.00029	52
WindSpeedChangeXHour19Change	-0.0955586	0.01931	53
DewPointTempChangeXHour18Change	-0.0899969	0.00001	54
WindSpeedChangeXHour17Change	-0.0773261	0.05099	55
WindSpeedChangeXHour3Change	0.0749143	0.13908	56
DewPointTempChangeXHour21Change	-0.0591256	0.00895	57
WindSpeedChange	0.0558260	0.00001	58
RainfallChangeXHour14Change	0.0543299	0.30246	59
HumidityChangeXHour5Change	0.0520518	0.00000	60
RainfallChangeXHour20Change	0.0510642	0.01339	61
HumidityChangeXHour9Change	0.0464562	0.00000	62
DewPointTempChangeXHour20Change	0.0463522	0.05489	63
HumidityChangeXHour1Change	-0.0455337	0.00000	64
HumidityChangeXHour23Change	-0.0448231	0.00000	65
HumidityChangeXHour8Change	0.0417470	0.00000	66
RainfallChangeXHour21Change	0.0414773	0.06156	67
HumidityChangeXHour11Change	0.0398494	0.00000	68
DewPointTempChangeXHour14Change	0.0397677	0.08600	69
WindSpeedChangeXHour18Change	-0.0337796	0.38576	70
HumidityChangeXHour6Change	0.0334975	0.00000	71
WindSpeedChangeXSolarRadiationChange	0.0333527	0.00955	72
DewPointTempChangeXHour19Change	-0.0281334	0.12723	73
HumidityChangeXHour2Change	-0.0248498	0.00039	75
HumidityChangeXHour12Change	0.0242530	0.00103	76
HumidityChangeXHour7Change	0.0239154	0.00065	77
HumidityChangeXHour22Change	-0.0222907	0.00008	78
HumidityChangeXHour15Change	0.0220266	0.00034	79
DewPointTempChangeXHour13Change	-0.0206860	0.30207	80
DewPointTempChangeXWindSpeedChange	0.0151632	0.00004	81
WindSpeedChangeXHour11Change	0.0139488	0.78322	82
HumidityChangeXSolarRadiationChange	0.0138538	0.00000	83
WindSpeedChangeXHour10Change	-0.0133288	0.83297	84
RainfallChange	0.0080953	0.34788	85
HumidityChangeXSnowfallChange	-0.0032258	0.03118	86
DewPointTempChangeXRainfallChange	-0.0027972	0.60340	87
HumidityChangeXHour17Change	-0.0026350	0.71131	88

Factor	Coefficient	P.Value	Rank
HumidityChangeXHour14Change	-0.0025171	0.68692	89
HumidityChangeXRainfallChange	-0.0023085	0.02864	90
HumidityChangeXHour16Change	0.0015115	0.81863	91
HumidityChangeXDewPointTempChange	-0.0012099	0.00000	92
WindSpeedChangeXHour15Change	-0.0009915	0.98450	93
VisibilityChangeXHour2Change	-0.0005890	0.00000	94
VisibilityChangeXHour23Change	-0.0004830	0.00002	95
VisibilityChangeXHour1Change	-0.0004035	0.00213	96
VisibilityChange	-0.0003258	0.00000	97
VisibilityChangeXHour8Change	0.0002620	0.02803	98
VisibilityChangeXHour16Change	0.0001729	0.13451	99
VisibilityChangeXHour17Change	0.0001186	0.30717	100
VisibilityChangeXHour3Change	-0.0001107	0.36447	101
VisibilityChangeXHour20Change	-0.0000165	0.89642	102

## A.6

The theoretical model for Model (2) can be fully written as,

$$(2) \Delta\text{Temperature}_{st} = \beta_1\Delta\text{Humidity}_{st} + \beta_2\Delta\text{DewPointTemp}_{st} + \beta_3\Delta\text{Visibility}_{st} + \beta_4\Delta\text{WindSpeed}_{st} + \beta_5\Delta\text{SolarRadiation}_{st} + \beta_6\Delta\text{Rainfall}_{st} + \beta_7\Delta\text{Snowfall}_{st} + \beta_8\Delta I(\text{Hour}_t = 1) + \dots + \beta_{30}\Delta I(\text{Hour}_t = 23) + \beta_{31}\Delta\text{Humidity}_{st}\Delta\text{DewPointTemp}_{st} + \beta_{32}\Delta\text{Humidity}_{st}\Delta\text{SolarRadiation}_{st} + \beta_{33}\Delta\text{Humidity}_{st}\Delta\text{Rainfall}_{st} + \beta_{34}\Delta\text{Humidity}_{st}\Delta\text{Snowfall}_{st} + \beta_{35}\Delta\text{DewPointTemp}_{st}\Delta\text{WindSpeed}_{st} + \beta_{36}\Delta\text{DewPointTemp}_{st}\Delta\text{Rainfall}_{st} + \beta_{37}\Delta\text{WindSpeed}_{st}\Delta\text{Visibility}_{st} + \beta_{38}\Delta\text{WindSpeed}_{st}\Delta\text{SolarRadiation}_{st} + \beta_{39}\Delta\text{SolarRadiation}_{st}\Delta\text{Rainfall}_{st} + \sum_{j=1}^{23} \beta_{39+j}\Delta\text{Humidity}_{st}\Delta I(\text{Hour}_t = j) + \sum_{k=1}^{23} \beta_{62+k}\Delta\text{DewPointTemp}_{st}\Delta I(\text{Hour}_t = k) + \sum_{l=1}^{23} \beta_{85+l}\Delta\text{WindSpeed}_{st}\Delta I(\text{Hour}_t = l) + \sum_{m=1}^{23} \beta_{108+m}\Delta\text{Visibility}_{st}\Delta I(\text{Hour}_t = m) + \sum_{n=1}^{23} \beta_{131+n}\Delta\text{SolarRadiation}_{st}\Delta I(\text{Hour}_t = n) + \sum_{o=1}^{23} \beta_{154+o}\Delta\text{Rainfall}_{st}\Delta I(\text{Hour}_t = o) + \sum_{p=1}^{23} \beta_{177+p}\Delta\text{Snowfall}_{st}\Delta I(\text{Hour}_t = p) + \Delta\eta_{st}$$

$$\Delta\eta_{st} \stackrel{iid}{\sim} N(0, \sigma^2)$$

Due to the nature of elastic net regression, some of the coefficients for  $j, k, l, m, n, o$ , and  $p$  are 0:

$$\beta_{39+j} = 0 \quad \forall j \in \{3, 13, 15, 18, 20\}$$

$$\beta_{62+k} = 0 \quad \forall k \in \{3, 5, 6, 7, 8, 12, 15, 22, 23\}$$

$$\beta_{85+l} = 0 \quad \forall l \in \{1, 2, 3, 7, 8, 9, 12, 13, 14, 16, 20, 21, 22, 23\}$$

$$\beta_{108+m} = 0 \quad \forall m \in \{5, 6, 7, 10, 12, 13, 14, 15, 18, 21, 22\}$$

$$\begin{aligned}\beta_{131+n} &= 0 \quad \forall n \in \{8, 9, 15, 16, 18, 21, 22\} \\ \beta_{154+o} &= 0 \quad \forall o \in \{1, \dots, 8, 11, 12, 13, 15, 16, 17, 18, 19, 23\} \\ \beta_{177+p} &= 0 \quad \forall p \in \{1, \dots, 7, 11, \dots, 15, 17, 18, 20, 21, 22, 23\}\end{aligned}$$

## A.7

Choosing the optimal set of lagged effects,  $\delta_p \quad \forall p \in P$

Similar to choosing  $k$  in our  $k$ th-difference model such that  $\Delta\text{Temperature}_{st}$  was no longer dependent on  $\Delta\text{Temperature}_{st-k}$ , we need to find the optimal set  $P$  such that  $\text{RentedBikeCount}_{st}$  is no longer dependent on  $\text{RentedBikeCount}_{st-p} \quad \forall p \in P$ . To do this, we need to find the maximum lags ( $\max(P)$ ) that makes it so there is no longer a significant marginal effect on  $\text{RentedBikeCount}_{st}$ .

```
find_local_max = function(v){
  if(v[2] <= v[1]){
    maxes = v[1]
  } else {
    maxes = c()
  }

  for(i in 1:length(v)){
    if(i-1 >= 1 && i+1 <= length(v)){
      if(v[i-1] <= v[i] &&
         v[i+1] <= v[i]){
        maxes = c(maxes, v[i])
      }
    }
  }

  if(v[length(v)] >= v[(length(v)-1)]){
    maxes = c(maxes, v[length(v)])
  }

  return(maxes)
}

graphs = list()

for(season in seoul$Seasons %>% unique()){
  l = 1
```

```

alpha = 0.05
seoul.subset = seoul %>% filter(Seasons == season)
deltas = cov(seoul.subset$RentedBikeCount[(l+1):length(seoul.subset$RentedBikeCount)],
             lag(seoul.subset$RentedBikeCount, n=1)[(l+1):length(seoul.subset$RentedBikeCount)])
var(seoul.subset$RentedBikeCount[(l+1):length(seoul.subset$RentedBikeCount)])
p.value = 0

while(p.value < alpha){
  l = l+1

  deltas = c(deltas, cov(seoul.subset$RentedBikeCount[(l+1):length(seoul.subset$RentedBikeCount)],
                         lag(seoul.subset$RentedBikeCount, n=1)[(l+1):length(seoul.subset$RentedBikeCount)])
             var(seoul.subset$RentedBikeCount[(l+1):length(seoul.subset$RentedBikeCount)]))

  l.lm = lm(seoul.subset$RentedBikeCount[(l+1):length(seoul.subset$RentedBikeCount)] ~
            lag(seoul.subset$RentedBikeCount, n=1)[(l+1):length(seoul.subset$RentedBikeCount)])
  summary()
  p.value = l.lm$coefficients[, "Pr(>|t|)"] [2]
}

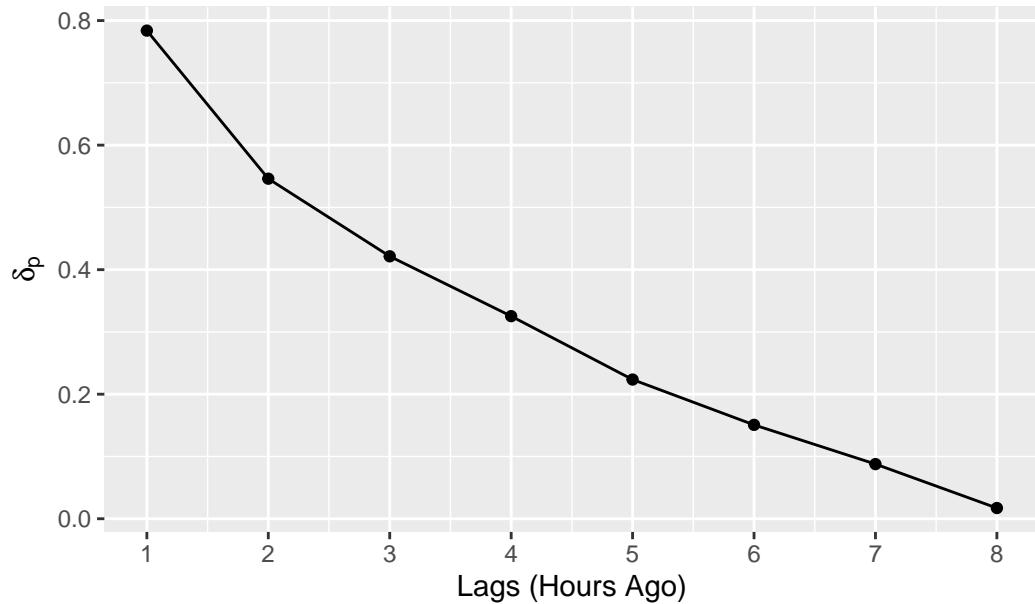
local.max = find_local_max(deltas)
deltas.max = which(deltas %in% local.max)

p = ggplot(mapping=aes(x=1:l, y=deltas))+
  geom_point()+
  geom_line()+
  xlab("Lags (Hours Ago)")+
  ylab(expression(delta[p]))+
  scale_x_continuous(breaks=1:l)+
  labs(title=str_c("Pth Lagged Effects on Rented Bike Count During ", season))

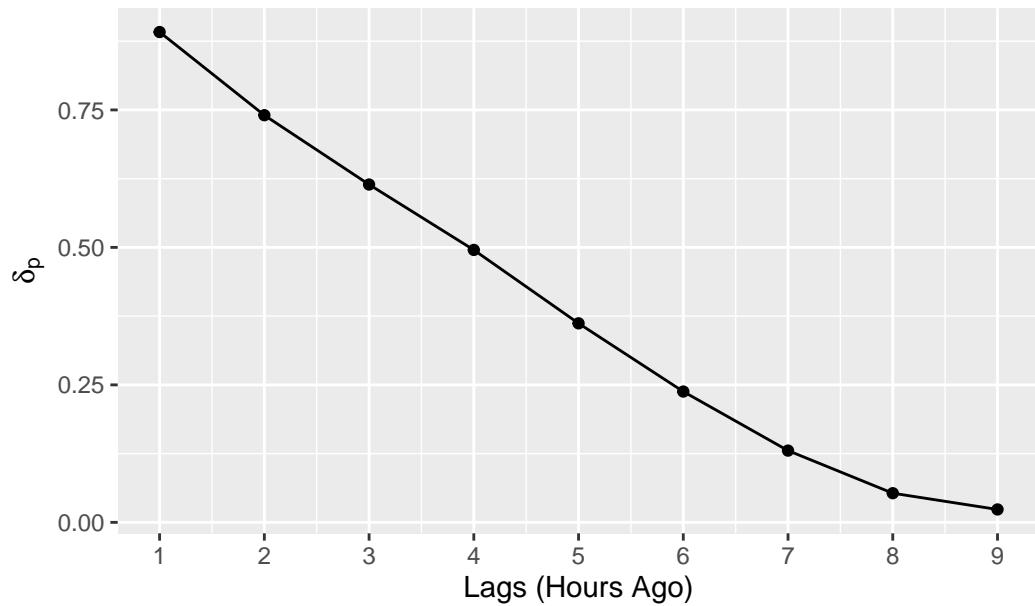
print(p)
}

```

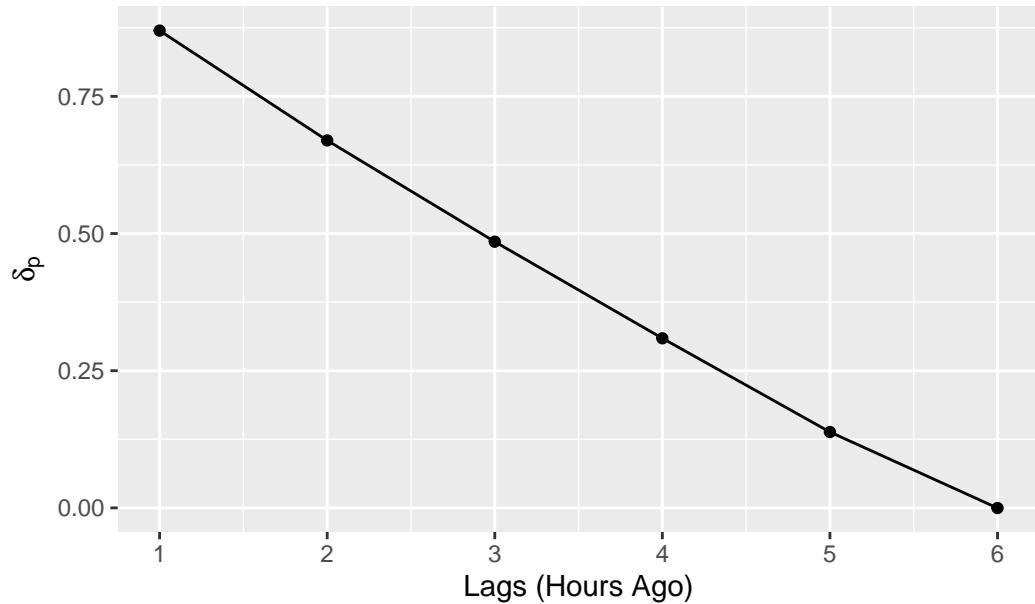
P<sup>th</sup> Lagged Effects on Rented Bike Count During Winter



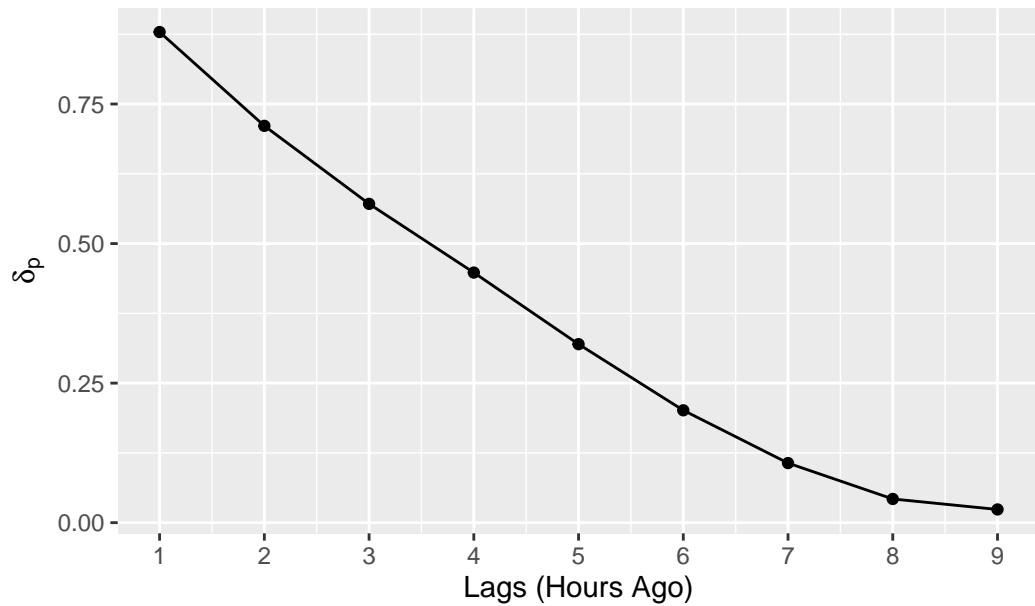
P<sup>th</sup> Lagged Effects on Rented Bike Count During Spring



P<sup>th</sup> Lagged Effects on Rented Bike Count During Summer



P<sup>th</sup> Lagged Effects on Rented Bike Count During Autumn



Since Spring is our base season, we will include  $p = 9$  lagged effects for  $\text{RentedBikeCount}_{st}$  in the base model, and since no other season has  $p > 9$ , we do not need any other lagged effects

dependent on season.

## A.8

Fitting a linear model to estimate parameters for Model (3)

```
model.3.factors = c(seoul.bike.factors,
                     bike.deltas) %>% setdiff(c(
                     time.humidities, seoul.bike.transformed))

seoul.bike.lm = lm(RentedBikeCount ~ .,
                     data=seoul[model.3.factors])
summary(seoul.bike.lm)
```

Call:

```
lm(formula = RentedBikeCount ~ ., data = seoul[model.3.factors])
```

Residuals:

Min	1Q	Median	3Q	Max
-1775.17	-78.47	2.31	74.81	1378.45

Coefficients:

	Estimate	Std. Error	t value	Pr(> t )
(Intercept)	2.945e+01	4.417e+01	0.667	0.505004
Humidity	-2.860e-01	4.603e-01	-0.621	0.534463
Temperature	1.091e+00	1.641e+00	0.665	0.506128
WindSpeed	-1.608e+00	2.307e+00	-0.697	0.485657
Visibility	9.769e-03	4.352e-03	2.245	0.024800 *
DewPointTemp	7.310e-01	1.704e+00	0.429	0.667946
SolarRadiation	5.752e+01	5.084e+00	11.313	< 2e-16 ***
Rainfall	-5.164e+00	1.903e+00	-2.714	0.006661 **
Snowfall	6.191e+00	4.890e+00	1.266	0.205530
IsHoliday	-2.126e+01	9.436e+00	-2.253	0.024281 *
Hour1	-5.452e+01	1.616e+01	-3.373	0.000747 ***
Hour2	-5.063e+01	1.608e+01	-3.149	0.001643 **
Hour3	-1.206e+02	1.567e+01	-7.696	1.56e-14 ***
Hour4	-9.982e+01	1.515e+01	-6.589	4.68e-11 ***
Hour5	-2.709e+01	1.583e+01	-1.712	0.086953 .
Hour6	9.300e+01	1.573e+01	5.911	3.52e-09 ***
Hour7	2.335e+02	1.591e+01	14.673	< 2e-16 ***
Hour8	3.394e+02	1.627e+01	20.861	< 2e-16 ***

```

Hour9          -4.198e+02  1.693e+01 -24.794 < 2e-16 ***
Hour10         -5.868e+01  1.751e+01 -3.350 0.000811 ***
Hour11         -3.354e+01  1.815e+01 -1.848 0.064682 .
Hour12         -1.776e-01  1.861e+01 -0.010 0.992384
Hour13         1.706e+01  1.862e+01  0.916 0.359597
Hour14         1.000e+01  1.652e+01  0.606 0.544820
Hour15         5.536e+01  1.827e+01  3.030 0.002454 **
Hour16         1.121e+02  1.769e+01  6.338 2.45e-10 ***
Hour17         1.661e+02  1.648e+01 10.079 < 2e-16 ***
Hour18         3.936e+02  1.582e+01 24.883 < 2e-16 ***
Hour19         -2.202e+02  1.640e+01 -13.430 < 2e-16 ***
Hour20         1.038e+02  1.608e+01  6.455 1.14e-10 ***
Hour21         5.696e+01  1.600e+01  3.561 0.000371 ***
Hour22         -8.296e+00  1.610e+01 -0.515 0.606336
Hour23         -8.919e+01  1.613e+01 -5.530 3.30e-08 ***
IsWinter       -1.927e+01  8.511e+00 -2.264 0.023619 *
IsSummer       7.420e+00  7.886e+00  0.941 0.346733
IsAutumn       1.417e+01  6.028e+00  2.350 0.018777 *
RentedBikeCount_Lag1 1.107e+00  1.065e-02 103.917 < 2e-16 ***
RentedBikeCount_Lag2 -3.318e-01  1.589e-02 -20.888 < 2e-16 ***
RentedBikeCount_Lag3  1.165e-01  1.628e-02   7.160 8.70e-13 ***
RentedBikeCount_Lag4  2.701e-02  1.632e-02   1.655 0.097899 .
RentedBikeCount_Lag5 -9.975e-02  1.629e-02  -6.124 9.50e-10 ***
RentedBikeCount_Lag6 -1.915e-03  1.632e-02  -0.117 0.906606
RentedBikeCount_Lag7  1.799e-02  1.627e-02   1.105 0.268987
RentedBikeCount_Lag8 -1.067e-01  1.587e-02  -6.723 1.89e-11 ***
RentedBikeCount_Lag9  1.447e-01  1.049e-02  13.793 < 2e-16 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

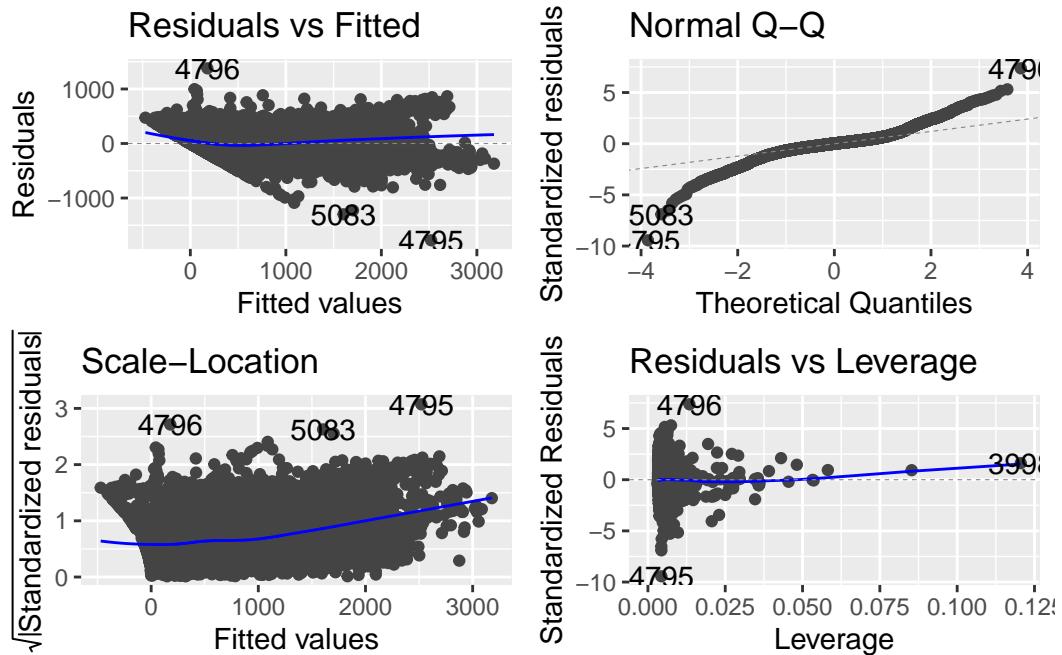
```

```

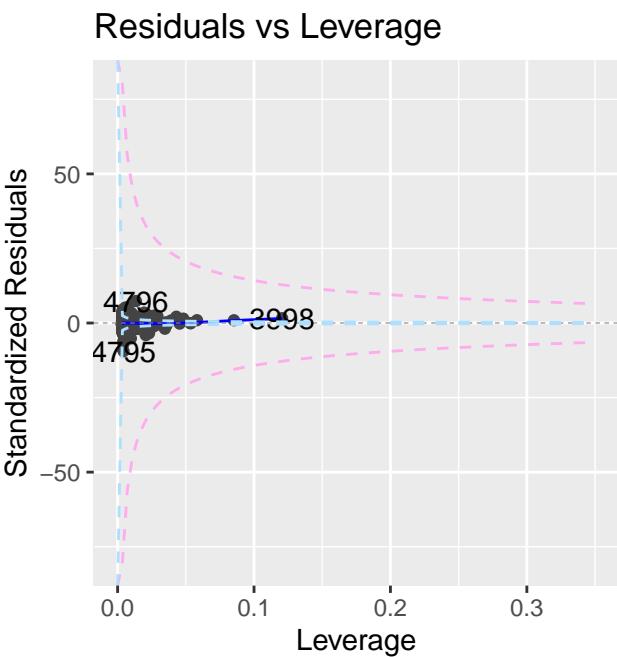
Residual standard error: 188.5 on 8706 degrees of freedom
(9 observations deleted due to missingness)
Multiple R-squared:  0.9151,    Adjusted R-squared:  0.9146
F-statistic:  2132 on 44 and 8706 DF,  p-value: < 2.2e-16

```

```
autoplot(seoul.bike.lm)
```



```
show_leverage(seoul.bike.lm)
```



Linearity seems to be roughly met and even Normality can be appealed to. However, in the  $\sqrt{|\text{Standardized residuals}|}$  vs. Fitted values Plot, homoskedasticity appears to be violated, with some interesting trends happening with fitted values  $\$ < 1000\$$ .

## A.9

Including all necessary interaction terms, we ran an elastic net regression to see if we could better meet the model assumptions.

```

singularities = c("SolarRadiationXHour1", "SolarRadiationXHour2", "SolarRadiationXHour3",
                  "SnowfallXIIsFunctioningDay", "SolarRadiationXHour4",
                  "SolarRadiationXHour5", "SolarRadiationXHour20", "SolarRadiationXHour21",
                  "SolarRadiationXHour22", "SolarRadiationXHour23", "SnowfallXIIsSummer",
                  "SnowfallXIIsAutumn")

seoul = create_interaction_terms(seoul)

model.bike.factors = setdiff(c(seoul.bike.factors, seoul.bike.interaction),
                             c(seoul.bike.base, "RentedBikeCount", singularities,
                                humidity.interactions))

seoul.bike.x = as.matrix(seoul[(length(bike.deltas)+1):nrow(seoul),model.bike.factors])
seoul.bike.y = as.matrix(seoul[(length(bike.deltas)+1):nrow(seoul),"RentedBikeCount"])

elastic_cv <- cv.glmnet(x = seoul.bike.x,
                        y = seoul.bike.y,
                        type.measure = "mse",
                        alpha = 1)

d = coef(elastic_cv, s = "lambda.1se")[2:(length(model.bike.factors)-1)]
elastic.bike.factors = model.bike.factors[which(d != 0)]
seoul.bike.elastic = lm(RentedBikeCount ~ .,
                        seoul[c("RentedBikeCount",
                               elastic.bike.factors)])

print(summary(seoul.bike.elastic))

```

Call:

```
lm(formula = RentedBikeCount ~ ., data = seoul[c("RentedBikeCount",
                                               elastic.bike.factors)])
```

Residuals:

	Min	1Q	Median	3Q	Max
	-2425.83	-35.36	-0.18	36.55	1022.18

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	3.845e+01	6.953e+00	5.531
WindSpeed	-6.013e+00	2.009e+00	-2.993
Rainfall	-7.437e-01	2.259e+00	-0.329
Hour3	2.159e+01	3.970e+01	0.544
Hour4	1.747e+01	3.806e+01	0.459
Hour11	7.070e+00	1.249e+01	0.566
IsWinter	6.849e+00	2.146e+01	0.319
RentedBikeCount_Lag1	8.108e-01	2.143e-02	37.832
RentedBikeCount_Lag5	-2.482e-02	8.104e-03	-3.063
HumidityXVisibility	1.979e-04	4.265e-05	4.639
HumidityXSolarRadiation	2.004e-01	1.046e-01	1.917
HumidityXRentedBikeCount_Lag1	2.041e-03	2.572e-04	7.934
HumidityXRentedBikeCount_Lag2	-2.137e-03	1.885e-04	-11.342
TemperatureXDewPointTemp	-6.100e-02	1.351e-02	-4.517
TemperatureXRentedBikeCount_Lag1	7.776e-04	5.070e-04	1.534
TemperatureXRentedBikeCount_Lag3	9.457e-04	5.669e-04	1.668
WindSpeedXRentedBikeCount_Lag5	-6.548e-03	2.521e-03	-2.597
WindSpeedXRentedBikeCount_Lag9	6.413e-03	2.383e-03	2.692
DewPointTempXSolarRadiation	-5.309e-01	2.643e-01	-2.009
DewPointTempXRentedBikeCount_Lag3	1.147e-03	6.693e-04	1.713
SolarRadiationXRainfall	4.544e+01	1.445e+01	3.145
SolarRadiationXIsHoliday	6.930e+00	6.072e+00	1.141
SolarRadiationXRentedBikeCount_Lag1	2.394e-02	5.515e-03	4.340
SolarRadiationXRentedBikeCount_Lag6	9.271e-04	4.843e-03	0.191
SolarRadiationXRentedBikeCount_Lag9	3.076e-02	6.713e-03	4.582
RainfallXSnowfall	-2.915e-01	2.218e+00	-0.131
RainfallXRentedBikeCount_Lag1	-8.192e-02	1.100e-02	-7.447
RainfallXRentedBikeCount_Lag3	3.031e-02	4.709e-03	6.437
RainfallXRentedBikeCount_Lag8	-2.959e-03	3.381e-03	-0.875
SnowfallXRentedBikeCount_Lag9	-1.681e-03	1.193e-02	-0.141
IsHolidayXRentedBikeCount_Lag6	-1.039e-02	7.414e-03	-1.401
RentedBikeCount_Lag1XRentedBikeCount_Lag2	-1.259e-05	4.879e-06	-2.580
RentedBikeCount_Lag2XRentedBikeCount_Lag5	-2.164e-05	5.367e-06	-4.033
HumidityXHour3	-3.029e-01	4.200e-01	-0.721
HumidityXHour4	-2.839e-01	4.001e-01	-0.710
HumidityXHour7	1.258e+00	2.054e-01	6.126
HumidityXHour8	8.651e-01	1.536e-01	5.632

HumidityXHour13	3.204e-01	2.180e-01	1.470
HumidityXHour19	-2.541e+00	3.489e-01	-7.284
HumidityXHour20	-4.064e-01	1.729e-01	-2.350
HumidityXHour23	-1.455e-01	1.541e-01	-0.944
TemperatureXHour1	-1.074e+00	9.054e-01	-1.187
TemperatureXHour7	-6.402e+00	1.167e+00	-5.487
TemperatureXHour18	2.424e+00	1.689e+00	1.435
WindSpeedXHour1	-6.579e+00	6.549e+00	-1.005
WindSpeedXHour18	9.983e+00	5.648e+00	1.768
WindSpeedXHour19	-9.985e-01	6.127e+00	-0.163
VisibilityXHour1	-1.794e-02	9.166e-03	-1.957
VisibilityXHour2	-1.380e-02	6.660e-03	-2.072
VisibilityXHour3	-1.377e-02	1.145e-02	-1.203
VisibilityXHour4	-1.110e-02	1.115e-02	-0.996
VisibilityXHour17	1.392e-02	9.211e-03	1.511
VisibilityXHour18	2.506e-02	1.241e-02	2.019
DewPointTempXHour5	4.433e-01	6.397e-01	0.693
DewPointTempXHour8	-3.334e+00	5.685e-01	-5.864
DewPointTempXHour9	-6.400e-01	6.693e-01	-0.956
DewPointTempXHour11	-1.650e+00	5.833e-01	-2.829
DewPointTempXHour14	-5.002e-01	5.629e-01	-0.889
DewPointTempXHour16	1.149e+00	6.199e-01	1.854
DewPointTempXHour17	1.838e+00	8.687e-01	2.116
DewPointTempXHour18	1.594e+00	1.521e+00	1.048
DewPointTempXHour19	5.375e+00	1.153e+00	4.660
DewPointTempXHour20	2.780e+00	6.522e-01	4.262
DewPointTempXHour21	1.015e+00	6.887e-01	1.474
SolarRadiationXHour8	-1.490e+02	2.083e+01	-7.155
SolarRadiationXHour9	3.347e+01	1.430e+01	2.341
SolarRadiationXHour19	6.262e+02	5.303e+01	11.810
RainfallXHour7	8.694e+00	6.604e+00	1.316
RainfallXHour9	-6.939e+00	4.771e+00	-1.454
RainfallXHour10	-1.087e+01	6.778e+00	-1.604
RainfallXHour13	1.807e+00	3.508e+00	0.515
RainfallXHour16	-2.783e+01	1.442e+01	-1.930
RainfallXHour17	-5.202e+01	7.739e+00	-6.722
RainfallXHour18	-1.753e+00	4.408e+00	-0.398
RainfallXHour19	-1.170e+01	1.042e+01	-1.123
RainfallXHour20	-1.396e+01	3.824e+00	-3.650
RainfallXHour22	-9.362e+00	1.092e+01	-0.857
SnowfallXHour7	-1.381e+01	1.359e+01	-1.017
SnowfallXHour8	-1.654e+01	1.237e+01	-1.338
SnowfallXHour9	-1.560e+01	1.211e+01	-1.288

SnowfallXHour19	2.672e+01	1.779e+01	1.502
IsHolidayXHour1	3.926e+01	2.739e+01	1.433
IsHolidayXHour2	3.375e+01	2.688e+01	1.256
IsHolidayXHour5	-3.458e+01	2.626e+01	-1.317
IsHolidayXHour6	2.138e+00	2.699e+01	0.079
IsHolidayXHour7	-2.543e+01	2.709e+01	-0.939
IsHolidayXHour8	-4.384e+01	2.680e+01	-1.636
IsHolidayXHour10	1.807e+01	2.779e+01	0.650
IsHolidayXHour15	-4.636e+01	2.753e+01	-1.684
IsHolidayXHour17	-3.366e+01	2.730e+01	-1.233
IsHolidayXHour18	-5.142e+01	2.758e+01	-1.865
IsHolidayXHour19	4.341e+01	2.747e+01	1.581
IsHolidayXHour20	2.945e+01	2.697e+01	1.092
RentedBikeCount_Lag1XHour1	-1.273e-01	2.866e-02	-4.443
RentedBikeCount_Lag1XHour2	-7.572e-02	1.992e-02	-3.801
RentedBikeCount_Lag1XHour3	-1.264e-01	3.004e-02	-4.208
RentedBikeCount_Lag1XHour4	-2.005e-01	4.357e-02	-4.601
RentedBikeCount_Lag1XHour6	2.127e+00	1.168e-01	18.208
RentedBikeCount_Lag1XHour7	1.452e+00	3.806e-02	38.165
RentedBikeCount_Lag1XHour8	7.167e-01	1.907e-02	37.575
RentedBikeCount_Lag1XHour9	-4.068e-01	5.352e-02	-7.600
RentedBikeCount_Lag1XHour11	2.006e-01	2.596e-02	7.726
RentedBikeCount_Lag1XHour12	1.971e-01	7.452e-02	2.645
RentedBikeCount_Lag1XHour13	5.953e-02	5.051e-02	1.179
RentedBikeCount_Lag1XHour14	1.883e-01	1.773e-02	10.623
RentedBikeCount_Lag1XHour15	1.820e-01	1.301e-02	13.990
RentedBikeCount_Lag1XHour16	1.860e-01	1.425e-02	13.058
RentedBikeCount_Lag1XHour17	1.562e-01	1.481e-02	10.552
RentedBikeCount_Lag1XHour18	7.704e-01	3.487e-02	22.095
RentedBikeCount_Lag1XHour19	-2.723e-01	1.489e-02	-18.294
RentedBikeCount_Lag1XHour23	-7.344e-02	6.671e-02	-1.101
RentedBikeCount_Lag2XHour6	-8.803e-01	2.951e-01	-2.982
RentedBikeCount_Lag2XHour9	-1.639e-02	1.195e-01	-0.137
RentedBikeCount_Lag2XHour10	-7.775e-02	5.051e-02	-1.539
RentedBikeCount_Lag2XHour12	1.074e-01	8.578e-02	1.252
RentedBikeCount_Lag2XHour23	3.643e-02	5.815e-02	0.626
RentedBikeCount_Lag3XHour6	-1.647e-01	1.616e-01	-1.020
RentedBikeCount_Lag3XHour7	-5.781e-01	2.729e-01	-2.118
RentedBikeCount_Lag3XHour9	-3.348e-01	1.384e-01	-2.418
RentedBikeCount_Lag3XHour10	1.225e-01	1.182e-01	1.036
RentedBikeCount_Lag3XHour13	2.752e-01	8.632e-02	3.188
RentedBikeCount_Lag3XHour18	-8.838e-01	6.646e-02	-13.298
RentedBikeCount_Lag3XHour21	8.416e-02	1.012e-02	8.312

RentedBikeCount_Lag4XHour7	-9.719e-02	1.634e-01	-0.595
RentedBikeCount_Lag4XHour10	-3.522e-01	1.399e-01	-2.518
RentedBikeCount_Lag4XHour18	2.320e-01	6.627e-02	3.501
RentedBikeCount_Lag4XHour19	2.612e-01	3.266e-02	7.997
RentedBikeCount_Lag4XHour22	4.578e-02	1.496e-02	3.060
RentedBikeCount_Lag5XHour9	9.743e-01	2.748e-01	3.546
RentedBikeCount_Lag5XHour13	-5.886e-02	4.950e-02	-1.189
RentedBikeCount_Lag5XHour20	1.493e-01	1.240e-02	12.045
RentedBikeCount_Lag5XHour22	2.320e-02	1.949e-02	1.190
RentedBikeCount_Lag6XHour9	3.468e-01	1.658e-01	2.092
RentedBikeCount_Lag6XHour10	4.988e-01	2.750e-01	1.814
RentedBikeCount_Lag6XHour13	-5.375e-03	7.707e-02	-0.070
RentedBikeCount_Lag6XHour19	7.503e-02	3.667e-02	2.046
RentedBikeCount_Lag7XHour1	9.316e-02	1.102e-02	8.454
RentedBikeCount_Lag7XHour10	5.454e-02	1.651e-01	0.330
RentedBikeCount_Lag7XHour21	5.053e-02	6.321e-02	0.799
RentedBikeCount_Lag8XHour14	-1.080e-01	4.551e-02	-2.373
RentedBikeCount_Lag8XHour16	2.120e-02	9.897e-03	2.142
RentedBikeCount_Lag8XHour18	-1.052e+00	8.676e-02	-12.131
RentedBikeCount_Lag8XHour21	1.195e-02	6.694e-02	0.179
RentedBikeCount_Lag9XHour1	-5.704e-02	1.611e-02	-3.541
RentedBikeCount_Lag9XHour5	8.391e-03	7.998e-03	1.049
RentedBikeCount_Lag9XHour13	-1.405e-01	1.217e-01	-1.155
RentedBikeCount_Lag9XHour17	1.367e-01	1.167e-02	11.718
RentedBikeCount_Lag9XHour18	1.091e+00	5.376e-02	20.287
HumidityXIIsWinter	-2.661e-01	2.402e-01	-1.108
HumidityXIIsAutumn	1.818e-01	8.116e-02	2.240
WindSpeedXIIsSummer	1.037e+01	3.345e+00	3.101
VisibilityXIIsWinter	-2.441e-03	6.646e-03	-0.367
SolarRadiationXIIsWinter	-1.828e+01	8.064e+00	-2.267
SolarRadiationXIIsSummer	-2.927e+01	5.061e+00	-5.784
RainfallXIIsWinter	-6.935e+00	6.003e+00	-1.155
RainfallXIIsSummer	-1.995e+00	2.570e+00	-0.776
Hour1XIIsWinter	3.681e+01	1.862e+01	1.977
Hour1XIIsAutumn	-4.191e+00	1.516e+01	-0.276
Hour2XIIsAutumn	-1.811e+01	1.423e+01	-1.272
Hour5XIIsSummer	3.768e+00	2.073e+01	0.182
Hour5XIIsAutumn	-2.676e+01	1.548e+01	-1.729
Hour6XIIsWinter	-1.996e+01	1.300e+01	-1.536
Hour6XIIsSummer	-4.197e+01	2.070e+01	-2.028
Hour6XIIsAutumn	8.372e+00	1.632e+01	0.513
Hour7XIIsWinter	-9.170e+01	2.000e+01	-4.584
Hour7XIIsSummer	-7.753e+01	2.098e+01	-3.696

Hour8XIIsAutumn	-9.121e+00	1.467e+01	-0.622
Hour9XIIsSummer	-2.289e+01	2.089e+01	-1.096
Hour10XIIsWinter	-1.721e+01	1.308e+01	-1.315
Hour10XIIsSummer	-5.993e+00	2.003e+01	-0.299
Hour11XIIsAutumn	-3.331e+01	1.446e+01	-2.304
Hour12XIIsSummer	-5.643e+01	1.857e+01	-3.039
Hour12XIIsAutumn	-6.149e+01	1.538e+01	-3.998
Hour13XIIsAutumn	1.247e+00	1.443e+01	0.086
Hour15XIIsSummer	4.069e+01	1.576e+01	2.582
Hour16XIIsSummer	4.019e-01	1.862e+01	0.022
Hour17XIIsWinter	-2.781e+01	1.883e+01	-1.477
Hour17XIIsSummer	1.392e+01	2.302e+01	0.605
Hour17XIIsAutumn	6.478e+00	1.753e+01	0.369
Hour18XIIsWinter	-3.214e+01	1.979e+01	-1.624
Hour18XIIsSummer	-1.192e+02	2.447e+01	-4.872
Hour18XIIsAutumn	-6.181e+01	1.794e+01	-3.446
Hour19XIIsWinter	1.322e+02	2.487e+01	5.316
Hour19XIIsSummer	1.233e+02	2.321e+01	5.309
Hour19XIIsAutumn	1.078e+02	1.839e+01	5.862
Hour20XIIsSummer	1.117e+02	1.953e+01	5.720
Hour21XIIsSummer	-5.811e+00	2.208e+01	-0.263
Hour21XIIsAutumn	-4.110e+01	1.560e+01	-2.634
RentedBikeCount_Lag1XIIsAutumn	1.398e-02	4.880e-03	2.865
RentedBikeCount_Lag3XIIsSummer	5.932e-03	7.734e-03	0.767
RentedBikeCount_Lag6XIIsSummer	1.886e-02	6.031e-03	3.128
Pr(> t )			
(Intercept)	3.28e-08	***	
WindSpeed	0.002767	**	
Rainfall	0.741987		
Hour3	0.586559		
Hour4	0.646304		
Hour11	0.571409		
IsWinter	0.749658		
RentedBikeCount_Lag1	< 2e-16	***	
RentedBikeCount_Lag5	0.002200	**	
HumidityXVisibility	3.56e-06	***	
HumidityXSolarRadiation	0.055334	.	
HumidityXRentedBikeCount_Lag1	2.39e-15	***	
HumidityXRentedBikeCount_Lag2	< 2e-16	***	
TemperatureXDewPointTemp	6.37e-06	***	
TemperatureXRentedBikeCount_Lag1	0.125124		
TemperatureXRentedBikeCount_Lag3	0.095349	.	
WindSpeedXRentedBikeCount_Lag5	0.009408	**	

WindSpeedXRentedBikeCount_Lag9	0.007124 **
DewPointTempXSolarRadiation	0.044587 *
DewPointTempXRentedBikeCount_Lag3	0.086697 .
SolarRadiationXRainfall	0.001665 **
SolarRadiationXIsHoliday	0.253763
SolarRadiationXRentedBikeCount_Lag1	1.44e-05 ***
SolarRadiationXRentedBikeCount_Lag6	0.848188
SolarRadiationXRentedBikeCount_Lag9	4.67e-06 ***
RainfallXSnowfall	0.895465
RainfallXRentedBikeCount_Lag1	1.05e-13 ***
RainfallXRentedBikeCount_Lag3	1.28e-10 ***
RainfallXRentedBikeCount_Lag8	0.381454
SnowfallXRentedBikeCount_Lag9	0.887980
IsHolidayXRentedBikeCount_Lag6	0.161200
RentedBikeCount_Lag1XRentedBikeCount_Lag2	0.009887 **
RentedBikeCount_Lag2XRentedBikeCount_Lag5	5.56e-05 ***
HumidityXHour3	0.470773
HumidityXHour4	0.477928
HumidityXHour7	9.39e-10 ***
HumidityXHour8	1.84e-08 ***
HumidityXHour13	0.141708
HumidityXHour19	3.54e-13 ***
HumidityXHour20	0.018794 *
HumidityXHour23	0.345301
TemperatureXHour1	0.235368
TemperatureXHour7	4.22e-08 ***
TemperatureXHour18	0.151336
WindSpeedXHour1	0.315094
WindSpeedXHour18	0.077177 .
WindSpeedXHour19	0.870543
VisibilityXHour1	0.050376 .
VisibilityXHour2	0.038306 *
VisibilityXHour3	0.228965
VisibilityXHour4	0.319369
VisibilityXHour17	0.130876
VisibilityXHour18	0.043506 *
DewPointTempXHour5	0.488312
DewPointTempXHour8	4.69e-09 ***
DewPointTempXHour9	0.338986
DewPointTempXHour11	0.004682 **
DewPointTempXHour14	0.374242
DewPointTempXHour16	0.063795 .
DewPointTempXHour17	0.034394 *

DewPointTempXHour18	0.294715
DewPointTempXHour19	3.21e-06 ***
DewPointTempXHour20	2.04e-05 ***
DewPointTempXHour21	0.140386
SolarRadiationXHour8	9.06e-13 ***
SolarRadiationXHour9	0.019264 *
SolarRadiationXHour19	< 2e-16 ***
RainfallXHour7	0.188058
RainfallXHour9	0.145855
RainfallXHour10	0.108743
RainfallXHour13	0.606442
RainfallXHour16	0.053644 .
RainfallXHour17	1.91e-11 ***
RainfallXHour18	0.690922
RainfallXHour19	0.261402
RainfallXHour20	0.000263 ***
RainfallXHour22	0.391276
SnowfallXHour7	0.309346
SnowfallXHour8	0.181035
SnowfallXHour9	0.197773
SnowfallXHour19	0.133127
IsHolidayXHour1	0.151890
IsHolidayXHour2	0.209258
IsHolidayXHour5	0.188021
IsHolidayXHour6	0.936880
IsHolidayXHour7	0.347910
IsHolidayXHour8	0.101830
IsHolidayXHour10	0.515564
IsHolidayXHour15	0.092176 .
IsHolidayXHour17	0.217516
IsHolidayXHour18	0.062267 .
IsHolidayXHour19	0.114013
IsHolidayXHour20	0.274861
RentedBikeCount_Lag1XHour1	8.98e-06 ***
RentedBikeCount_Lag1XHour2	0.000145 ***
RentedBikeCount_Lag1XHour3	2.60e-05 ***
RentedBikeCount_Lag1XHour4	4.27e-06 ***
RentedBikeCount_Lag1XHour6	< 2e-16 ***
RentedBikeCount_Lag1XHour7	< 2e-16 ***
RentedBikeCount_Lag1XHour8	< 2e-16 ***
RentedBikeCount_Lag1XHour9	3.28e-14 ***
RentedBikeCount_Lag1XHour11	1.23e-14 ***
RentedBikeCount_Lag1XHour12	0.008181 **

RentedBikeCount_Lag1XHour13	0.238552
RentedBikeCount_Lag1XHour14	< 2e-16 ***
RentedBikeCount_Lag1XHour15	< 2e-16 ***
RentedBikeCount_Lag1XHour16	< 2e-16 ***
RentedBikeCount_Lag1XHour17	< 2e-16 ***
RentedBikeCount_Lag1XHour18	< 2e-16 ***
RentedBikeCount_Lag1XHour19	< 2e-16 ***
RentedBikeCount_Lag1XHour23	0.270971
RentedBikeCount_Lag2XHour6	0.002867 **
RentedBikeCount_Lag2XHour9	0.890859
RentedBikeCount_Lag2XHour10	0.123768
RentedBikeCount_Lag2XHour12	0.210454
RentedBikeCount_Lag2XHour23	0.531072
RentedBikeCount_Lag3XHour6	0.307969
RentedBikeCount_Lag3XHour7	0.034162 *
RentedBikeCount_Lag3XHour9	0.015619 *
RentedBikeCount_Lag3XHour10	0.300033
RentedBikeCount_Lag3XHour13	0.001439 **
RentedBikeCount_Lag3XHour18	< 2e-16 ***
RentedBikeCount_Lag3XHour21	< 2e-16 ***
RentedBikeCount_Lag4XHour7	0.551890
RentedBikeCount_Lag4XHour10	0.011813 *
RentedBikeCount_Lag4XHour18	0.000466 ***
RentedBikeCount_Lag4XHour19	1.44e-15 ***
RentedBikeCount_Lag4XHour22	0.002221 **
RentedBikeCount_Lag5XHour9	0.000394 ***
RentedBikeCount_Lag5XHour13	0.234405
RentedBikeCount_Lag5XHour20	< 2e-16 ***
RentedBikeCount_Lag5XHour22	0.234131
RentedBikeCount_Lag6XHour9	0.036485 *
RentedBikeCount_Lag6XHour10	0.069706 .
RentedBikeCount_Lag6XHour13	0.944398
RentedBikeCount_Lag6XHour19	0.040758 *
RentedBikeCount_Lag7XHour1	< 2e-16 ***
RentedBikeCount_Lag7XHour10	0.741180
RentedBikeCount_Lag7XHour21	0.424070
RentedBikeCount_Lag8XHour14	0.017679 *
RentedBikeCount_Lag8XHour16	0.032231 *
RentedBikeCount_Lag8XHour18	< 2e-16 ***
RentedBikeCount_Lag8XHour21	0.858330
RentedBikeCount_Lag9XHour1	0.000401 ***
RentedBikeCount_Lag9XHour5	0.294157
RentedBikeCount_Lag9XHour13	0.248136

RentedBikeCount_Lag9XHour17	< 2e-16 ***
RentedBikeCount_Lag9XHour18	< 2e-16 ***
HumidityXIIsWinter	0.267958
HumidityXIIsAutumn	0.025106 *
WindSpeedXIIsSummer	0.001935 **
VisibilityXIIsWinter	0.713341
SolarRadiationXIIsWinter	0.023435 *
SolarRadiationXIIsSummer	7.55e-09 ***
RainfallXIIsWinter	0.248033
RainfallXIIsSummer	0.437592
Hour1XIIsWinter	0.048104 *
Hour1XIIsAutumn	0.782244
Hour2XIIsAutumn	0.203409
Hour5XIIsSummer	0.855732
Hour5XIIsAutumn	0.083831 .
Hour6XIIsWinter	0.124641
Hour6XIIsSummer	0.042619 *
Hour6XIIsAutumn	0.607922
Hour7XIIsWinter	4.62e-06 ***
Hour7XIIsSummer	0.000221 ***
Hour8XIIsAutumn	0.533984
Hour9XIIsSummer	0.273245
Hour10XIIsWinter	0.188416
Hour10XIIsSummer	0.764774
Hour11XIIsAutumn	0.021245 *
Hour12XIIsSummer	0.002382 **
Hour12XIIsAutumn	6.45e-05 ***
Hour13XIIsAutumn	0.931135
Hour15XIIsSummer	0.009832 **
Hour16XIIsSummer	0.982782
Hour17XIIsWinter	0.139702
Hour17XIIsSummer	0.545381
Hour17XIIsAutumn	0.711775
Hour18XIIsWinter	0.104396
Hour18XIIsSummer	1.12e-06 ***
Hour18XIIsAutumn	0.000573 ***
Hour19XIIsWinter	1.09e-07 ***
Hour19XIIsSummer	1.13e-07 ***
Hour19XIIsAutumn	4.74e-09 ***
Hour20XIIsSummer	1.10e-08 ***
Hour21XIIsSummer	0.792405
Hour21XIIsAutumn	0.008449 **
RentedBikeCount_Lag1XIIsAutumn	0.004185 **

```

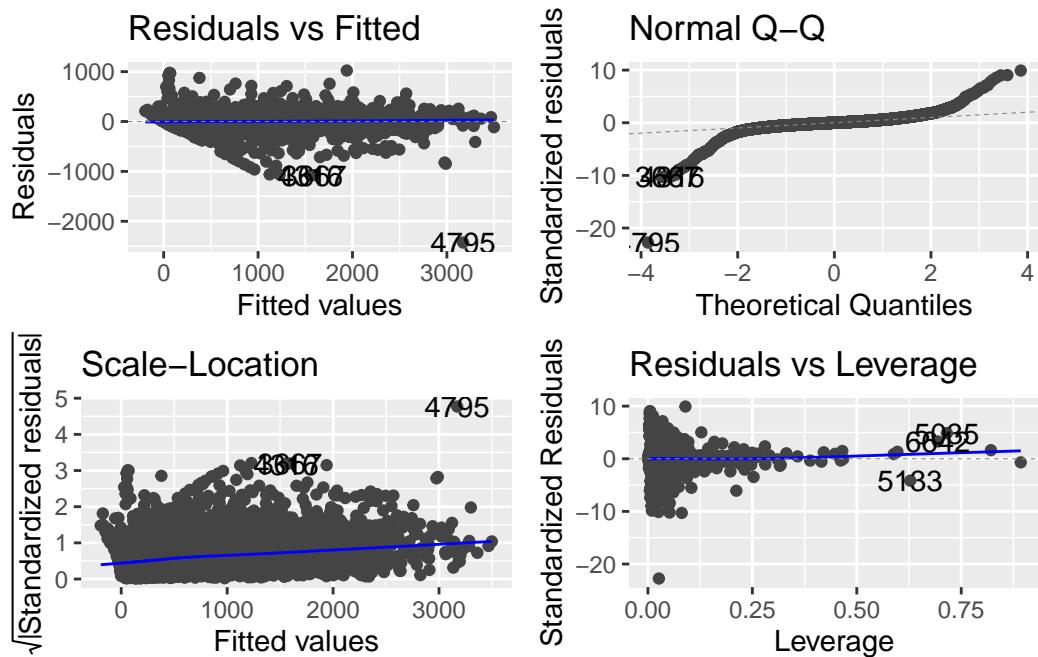
RentedBikeCount_Lag3XIsSummer          0.443105
RentedBikeCount_Lag6XIsSummer          0.001768 **

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 108.1 on 8560 degrees of freedom
(9 observations deleted due to missingness)
Multiple R-squared:  0.9726,    Adjusted R-squared:  0.9719
F-statistic:  1596 on 190 and 8560 DF,  p-value: < 2.2e-16

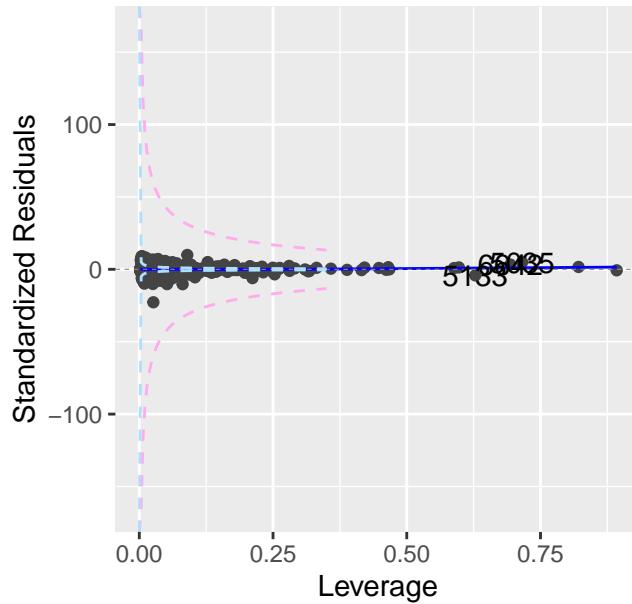
```

```
autoplot(seoul.bike.elastic)
```



```
show_leverage(seoul.bike.elastic)
```

Residuals vs Leverage



### A.10.0

Transformations of Model (3)

We first considered a log transformation of  $\text{RentedBikeCount}_{st}$

```
seoul$RentedBikeCount = log(seoul$RentedBikeCount + 1)
calculate_deltas()
seoul = create_interaction_terms(seoul)

seoul.bike.x = as.matrix(seoul[(length(bike.deltas)+1):nrow(seoul),model.bike.factors])
seoul.bike.y = as.matrix(seoul[(length(bike.deltas)+1):nrow(seoul),"RentedBikeCount"])

elastic_cv <- cv.glmnet(x = seoul.bike.x,
                        y = seoul.bike.y,
                        type.measure = "mse",
                        alpha = 1)

d = coef(elastic_cv, s = "lambda.1se")[2:(length(model.bike.factors)-1)]
elastic.bike.factors.log = model.bike.factors[which(d != 0)]
seoul.bike.elastic.log = lm(RentedBikeCount ~ .,
                            seoul[c("RentedBikeCount",
```

```

elastic.bike.factors.log]))  

print(summary(seoul.bike.elastic.log))

```

Call:

```
lm(formula = RentedBikeCount ~ ., data = seoul[c("RentedBikeCount",
  elastic.bike.factors.log)])
```

Residuals:

Min	1Q	Median	3Q	Max
-6.2976	-0.0752	0.0080	0.0970	2.0034

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	5.183e+00	2.060e-01	25.158
Humidity	-3.596e-03	2.289e-03	-1.571
Visibility	1.389e-04	5.292e-05	2.624
SolarRadiation	-1.568e-01	6.604e-02	-2.374
Rainfall	-3.320e-01	3.787e-02	-8.766
Hour1	-4.986e+00	2.529e-01	-19.714
Hour2	-5.062e+00	2.813e-01	-17.992
Hour3	-4.979e+00	2.609e-01	-19.082
Hour4	-5.104e+00	2.684e-01	-19.014
Hour5	-4.418e+00	2.258e-01	-19.566
Hour6	-4.579e+00	2.323e-01	-19.713
Hour7	-4.666e+00	2.682e-01	-17.399
Hour8	-5.084e+00	2.770e-01	-18.350
Hour9	-4.707e+00	2.383e-01	-19.752
Hour10	-4.836e+00	2.286e-01	-21.154
Hour11	-4.474e+00	2.327e-01	-19.226
Hour12	-4.346e+00	2.208e-01	-19.682
Hour13	-5.250e+00	4.754e-01	-11.045
Hour14	-4.368e+00	2.259e-01	-19.341
Hour15	-4.220e+00	2.054e-01	-20.551
Hour16	-4.519e+00	2.406e-01	-18.783
Hour17	-5.302e+00	4.924e-01	-10.767
Hour18	-3.794e+00	4.447e-01	-8.532
Hour19	-5.079e+00	2.188e-01	-23.211
Hour20	-4.982e+00	2.112e-01	-23.588
Hour21	-5.052e+00	2.140e-01	-23.612
Hour22	-4.996e+00	2.067e-01	-24.175

Hour23	-5.230e+00	1.757e-01	-29.764
IsAutumn	-2.585e-02	6.889e-02	-0.375
RentedBikeCount_Lag1	6.899e-01	4.284e-02	16.104
RentedBikeCount_Lag5	-8.311e-02	5.086e-02	-1.634
RentedBikeCount_Lag6	-6.095e-02	4.682e-02	-1.302
RentedBikeCount_Lag7	-2.040e-01	4.973e-02	-4.102
RentedBikeCount_Lag8	-2.215e-01	4.569e-02	-4.848
RentedBikeCount_Lag9	6.515e-02	4.608e-02	1.414
HumidityXVisibility	4.390e-07	5.370e-07	0.818
HumidityXSolarRadiation	1.533e-03	6.502e-04	2.357
HumidityXRentedBikeCount_Lag1	1.641e-03	5.218e-04	3.145
HumidityXRentedBikeCount_Lag2	-1.268e-03	4.336e-04	-2.925
HumidityXRentedBikeCount_Lag6	4.143e-05	4.098e-04	0.101
HumidityXRentedBikeCount_Lag9	-1.081e-03	3.660e-04	-2.952
TemperatureXDewPointTemp	1.588e-05	9.383e-05	0.169
TemperatureXSolarRadiation	-7.073e-04	1.494e-03	-0.474
TemperatureXRentedBikeCount_Lag1	4.851e-03	9.856e-04	4.922
TemperatureXRentedBikeCount_Lag3	3.484e-04	1.198e-03	0.291
WindSpeedXDewPointTemp	-3.131e-04	4.243e-04	-0.738
WindSpeedXRainfall	6.440e-03	5.476e-03	1.176
WindSpeedXSnowfall	2.562e-03	1.325e-02	0.193
WindSpeedXIsholiday	-1.579e-03	1.837e-02	-0.086
WindSpeedXRentedBikeCount_Lag1	1.769e-04	1.653e-03	0.107
VisibilityXDewPointTemp	2.915e-07	9.625e-07	0.303
VisibilityXRainfall	5.287e-05	9.663e-06	5.471
VisibilityXSnowfall	-1.687e-05	2.221e-05	-0.759
VisibilityXIsholiday	1.487e-05	4.113e-05	0.362
VisibilityXRentedBikeCount_Lag7	-2.243e-05	5.409e-06	-4.147
DewPointTempXRainfall	2.767e-03	1.425e-03	1.941
DewPointTempXSnowfall	8.376e-05	2.258e-03	0.037
DewPointTempXIsholiday	5.528e-03	3.562e-03	1.552
DewPointTempXRentedBikeCount_Lag3	-2.367e-04	7.845e-04	-0.302
SolarRadiationXRainfall	1.537e-01	6.498e-02	2.366
SolarRadiationXIsholiday	6.134e-02	4.478e-02	1.370
SolarRadiationXRentedBikeCount_Lag1	-8.425e-02	3.052e-02	-2.761
SolarRadiationXRentedBikeCount_Lag2	5.321e-02	3.331e-02	1.597
SolarRadiationXRentedBikeCount_Lag4	-1.614e-02	2.273e-02	-0.710
SolarRadiationXRentedBikeCount_Lag5	5.329e-02	1.763e-02	3.023
SolarRadiationXRentedBikeCount_Lag9	2.367e-02	1.131e-02	2.094
RainfallXSnowfall	6.829e-04	8.893e-03	0.077
RainfallXIsholiday	-5.760e-02	4.026e-02	-1.431
RainfallXRentedBikeCount_Lag1	-6.525e-02	7.384e-03	-8.837
RainfallXRentedBikeCount_Lag2	1.354e-02	7.139e-03	1.896

RainfallXRentedBikeCount_Lag4	3.983e-03	6.531e-03	0.610
RainfallXRentedBikeCount_Lag8	1.749e-02	4.509e-03	3.879
SnowfallXIsHoliday	8.865e-02	9.278e-02	0.955
SnowfallXRentedBikeCount_Lag2	-1.611e-02	9.201e-03	-1.751
SnowfallXRentedBikeCount_Lag9	1.150e-02	8.145e-03	1.412
IsHolidayXRentedBikeCount_Lag1	6.045e-03	1.879e-02	0.322
IsHolidayXRentedBikeCount_Lag4	-3.077e-02	1.800e-02	-1.709
RentedBikeCount_Lag1XRentedBikeCount_Lag2	-1.679e-02	4.087e-03	-4.109
RentedBikeCount_Lag1XRentedBikeCount_Lag7	2.456e-02	6.450e-03	3.808
RentedBikeCount_Lag1XRentedBikeCount_Lag8	7.387e-03	1.052e-02	0.702
RentedBikeCount_Lag1XRentedBikeCount_Lag9	-1.493e-02	8.921e-03	-1.674
RentedBikeCount_Lag2XRentedBikeCount_Lag3	-1.552e-02	3.679e-03	-4.220
RentedBikeCount_Lag3XRentedBikeCount_Lag4	-1.585e-03	4.462e-03	-0.355
RentedBikeCount_Lag3XRentedBikeCount_Lag5	-5.954e-03	5.250e-03	-1.134
RentedBikeCount_Lag4XRentedBikeCount_Lag5	-2.397e-03	5.859e-03	-0.409
RentedBikeCount_Lag4XRentedBikeCount_Lag9	-4.393e-04	5.627e-03	-0.078
RentedBikeCount_Lag5XRentedBikeCount_Lag9	5.076e-03	5.748e-03	0.883
RentedBikeCount_Lag6XRentedBikeCount_Lag8	-5.303e-04	1.001e-02	-0.053
RentedBikeCount_Lag6XRentedBikeCount_Lag9	3.786e-03	9.832e-03	0.385
RentedBikeCount_Lag7XRentedBikeCount_Lag8	1.515e-02	4.638e-03	3.266
HumidityXHour1	8.718e-03	2.047e-03	4.258
HumidityXHour2	7.979e-03	2.089e-03	3.820
HumidityXHour3	8.431e-03	2.090e-03	4.033
HumidityXHour4	8.510e-03	2.029e-03	4.194
HumidityXHour5	7.768e-03	1.761e-03	4.411
HumidityXHour6	8.718e-03	1.805e-03	4.831
HumidityXHour7	9.991e-03	2.088e-03	4.784
HumidityXHour8	6.812e-03	2.236e-03	3.046
HumidityXHour9	6.389e-03	2.351e-03	2.718
HumidityXHour10	7.486e-03	2.131e-03	3.513
HumidityXHour11	5.899e-03	2.147e-03	2.747
HumidityXHour12	2.254e-03	2.181e-03	1.033
HumidityXHour13	1.569e-02	5.075e-03	3.092
HumidityXHour14	2.577e-03	2.255e-03	1.143
HumidityXHour15	1.060e-03	1.885e-03	0.562
HumidityXHour16	3.346e-03	2.155e-03	1.553
HumidityXHour17	1.250e-02	5.317e-03	2.351
HumidityXHour18	-5.711e-03	5.071e-03	-1.126
HumidityXHour19	6.119e-03	1.947e-03	3.142
HumidityXHour20	5.473e-03	1.911e-03	2.863
HumidityXHour21	9.449e-03	1.962e-03	4.816
HumidityXHour22	7.543e-03	2.006e-03	3.759
HumidityXHour23	7.323e-03	1.746e-03	4.194

TemperatureXHour1	-3.436e-02	3.570e-03	-9.627
TemperatureXHour2	-3.539e-02	3.643e-03	-9.714
TemperatureXHour3	-2.669e-02	3.597e-03	-7.419
TemperatureXHour4	-2.667e-02	4.177e-03	-6.387
TemperatureXHour5	-2.389e-02	3.390e-03	-7.046
TemperatureXHour6	-2.937e-02	4.091e-03	-7.178
TemperatureXHour7	-3.621e-02	4.145e-03	-8.736
TemperatureXHour8	-3.574e-02	4.470e-03	-7.996
TemperatureXHour9	-3.880e-02	4.653e-03	-8.337
TemperatureXHour10	-3.184e-02	4.484e-03	-7.101
TemperatureXHour11	-2.888e-02	4.752e-03	-6.076
TemperatureXHour12	-2.703e-02	4.041e-03	-6.689
TemperatureXHour13	-2.467e-03	1.571e-02	-0.157
TemperatureXHour14	-3.202e-02	4.145e-03	-7.723
TemperatureXHour15	-3.601e-02	4.600e-03	-7.828
TemperatureXHour16	-2.689e-02	4.609e-03	-5.835
TemperatureXHour17	-1.209e-02	1.591e-02	-0.760
TemperatureXHour18	-6.290e-02	1.561e-02	-4.028
TemperatureXHour19	-2.923e-02	4.398e-03	-6.646
TemperatureXHour20	-2.566e-02	4.187e-03	-6.129
TemperatureXHour21	-3.397e-02	4.269e-03	-7.959
TemperatureXHour22	-3.519e-02	3.496e-03	-10.065
TemperatureXHour23	-2.434e-02	4.258e-03	-5.718
WindSpeedXHour1	-2.042e-02	2.492e-02	-0.819
WindSpeedXHour2	-2.813e-02	2.568e-02	-1.095
WindSpeedXHour3	-1.767e-02	2.598e-02	-0.680
WindSpeedXHour4	-2.923e-02	2.488e-02	-1.175
WindSpeedXHour5	-5.086e-02	2.625e-02	-1.937
WindSpeedXHour6	-8.650e-03	2.612e-02	-0.331
WindSpeedXHour7	-1.316e-02	2.647e-02	-0.497
WindSpeedXHour9	-1.360e-02	2.552e-02	-0.533
WindSpeedXHour10	-2.094e-02	2.294e-02	-0.913
WindSpeedXHour11	-3.253e-02	2.234e-02	-1.456
WindSpeedXHour12	-2.927e-02	2.160e-02	-1.355
WindSpeedXHour13	-3.194e-02	2.121e-02	-1.506
WindSpeedXHour14	-2.212e-02	2.124e-02	-1.041
WindSpeedXHour15	-2.254e-02	2.062e-02	-1.093
WindSpeedXHour16	-1.881e-03	2.209e-02	-0.085
WindSpeedXHour17	1.643e-03	2.163e-02	0.076
WindSpeedXHour19	-2.164e-02	2.337e-02	-0.926
WindSpeedXHour20	-1.904e-02	2.188e-02	-0.870
WindSpeedXHour21	-3.155e-02	2.196e-02	-1.437
WindSpeedXHour22	-1.611e-02	2.278e-02	-0.707

VisibilityXHour1	-1.921e-05	4.066e-05	-0.472
VisibilityXHour2	-1.707e-05	4.164e-05	-0.410
VisibilityXHour3	-8.039e-06	4.250e-05	-0.189
VisibilityXHour4	3.183e-05	4.057e-05	0.785
VisibilityXHour7	-8.284e-06	4.019e-05	-0.206
VisibilityXHour8	-2.480e-05	4.158e-05	-0.596
VisibilityXHour9	-1.121e-05	4.341e-05	-0.258
VisibilityXHour10	1.677e-05	4.545e-05	0.369
VisibilityXHour11	-1.831e-05	4.697e-05	-0.390
VisibilityXHour12	-3.733e-05	4.603e-05	-0.811
VisibilityXHour14	-7.524e-06	4.460e-05	-0.169
VisibilityXHour16	1.180e-05	4.470e-05	0.264
VisibilityXHour17	-6.617e-06	4.453e-05	-0.149
VisibilityXHour19	2.664e-05	4.378e-05	0.609
VisibilityXHour20	-4.126e-05	4.213e-05	-0.979
VisibilityXHour21	1.439e-05	4.382e-05	0.328
VisibilityXHour22	-1.236e-05	4.277e-05	-0.289
DewPointTempXHour13	-3.320e-02	1.588e-02	-2.091
DewPointTempXHour17	-1.760e-02	1.670e-02	-1.054
DewPointTempXHour18	3.807e-02	1.692e-02	2.251
SolarRadiationXHour6	-1.822e+00	1.498e+00	-1.216
SolarRadiationXHour7	-1.314e-01	1.991e-01	-0.660
SolarRadiationXHour8	-1.132e-01	8.976e-02	-1.261
SolarRadiationXHour9	1.524e-01	6.434e-02	2.368
SolarRadiationXHour14	1.147e-02	3.898e-02	0.294
SolarRadiationXHour16	-3.605e-02	4.885e-02	-0.738
SolarRadiationXHour17	9.676e-03	6.369e-02	0.152
SolarRadiationXHour18	-9.726e-02	8.505e-02	-1.144
SolarRadiationXHour19	4.255e-01	1.729e-01	2.461
Rainfall1XHour1	3.493e-01	4.586e-02	7.616
Rainfall1XHour2	3.525e-01	4.132e-02	8.530
Rainfall1XHour3	3.356e-01	4.203e-02	7.985
Rainfall1XHour4	2.616e-01	2.695e-02	9.706
Rainfall1XHour5	1.974e-01	4.506e-02	4.381
Rainfall1XHour6	2.376e-01	3.571e-02	6.654
Rainfall1XHour7	3.617e-01	2.982e-02	12.131
Rainfall1XHour8	3.262e-01	2.814e-02	11.592
Rainfall1XHour9	3.082e-01	2.953e-02	10.437
Rainfall1XHour10	2.372e-01	3.587e-02	6.611
Rainfall1XHour11	2.825e-01	3.094e-02	9.130
Rainfall1XHour12	3.873e-01	3.714e-02	10.428
Rainfall1XHour13	3.491e-01	2.927e-02	11.927
Rainfall1XHour14	5.602e-01	5.509e-02	10.169

RainfallXHour15	3.871e-01	3.410e-02	11.353
RainfallXHour16	3.595e-01	5.779e-02	6.222
RainfallXHour17	1.863e-01	3.835e-02	4.858
RainfallXHour18	3.789e-01	2.924e-02	12.958
RainfallXHour19	3.038e-01	4.257e-02	7.136
RainfallXHour20	2.619e-01	2.712e-02	9.657
RainfallXHour21	3.215e-01	2.632e-02	12.216
RainfallXHour22	3.663e-01	5.466e-02	6.701
RainfallXHour23	4.030e-01	4.952e-02	8.138
SnowfallXHour1	6.701e-02	5.146e-02	1.302
SnowfallXHour2	2.037e-02	5.075e-02	0.401
SnowfallXHour4	3.663e-02	5.191e-02	0.706
SnowfallXHour5	2.963e-02	5.276e-02	0.562
SnowfallXHour6	-3.804e-02	5.074e-02	-0.750
SnowfallXHour7	1.591e-02	4.731e-02	0.336
SnowfallXHour9	-6.954e-02	4.581e-02	-1.518
SnowfallXHour11	5.530e-02	3.485e-02	1.587
SnowfallXHour12	8.362e-02	3.920e-02	2.133
SnowfallXHour14	7.813e-02	5.006e-02	1.561
SnowfallXHour16	8.749e-02	6.705e-02	1.305
SnowfallXHour17	-2.577e-02	6.710e-02	-0.384
SnowfallXHour18	2.127e-01	6.443e-02	3.301
SnowfallXHour19	2.657e-02	6.024e-02	0.441
SnowfallXHour20	5.618e-02	5.843e-02	0.961
SnowfallXHour21	6.540e-03	5.758e-02	0.114
SnowfallXHour22	3.143e-02	5.721e-02	0.549
SnowfallXHour23	2.031e-02	5.851e-02	0.347
IsHolidayXHour1	2.118e-01	9.736e-02	2.175
IsHolidayXHour2	2.288e-01	9.706e-02	2.358
IsHolidayXHour3	1.679e-01	9.773e-02	1.718
IsHolidayXHour4	5.249e-02	9.782e-02	0.537
IsHolidayXHour5	-1.736e-01	9.825e-02	-1.766
IsHolidayXHour6	6.559e-02	1.001e-01	0.655
IsHolidayXHour7	-1.019e-01	9.686e-02	-1.052
IsHolidayXHour8	7.351e-02	9.719e-02	0.756
IsHolidayXHour10	1.261e-01	1.081e-01	1.166
IsHolidayXHour11	6.385e-02	1.165e-01	0.548
IsHolidayXHour12	1.157e-02	1.223e-01	0.095
IsHolidayXHour13	-5.178e-02	1.225e-01	-0.423
IsHolidayXHour14	1.061e-01	1.207e-01	0.880
IsHolidayXHour15	-3.307e-02	1.147e-01	-0.288
IsHolidayXHour16	1.014e-02	1.081e-01	0.094
IsHolidayXHour17	2.554e-02	1.046e-01	0.244

IsHolidayXHour18	-3.894e-02	9.971e-02	-0.391
IsHolidayXHour19	2.215e-01	1.003e-01	2.208
IsHolidayXHour20	1.390e-01	9.943e-02	1.398
IsHolidayXHour21	1.500e-01	1.012e-01	1.481
IsHolidayXHour23	1.521e-01	9.972e-02	1.525
RentedBikeCount_Lag1XHour3	1.748e-01	7.965e-02	2.194
RentedBikeCount_Lag1XHour4	7.622e-02	9.763e-02	0.781
RentedBikeCount_Lag1XHour6	6.389e-01	5.084e-02	12.566
RentedBikeCount_Lag1XHour7	4.716e-01	3.144e-02	14.999
RentedBikeCount_Lag1XHour8	4.328e-01	2.848e-02	15.194
RentedBikeCount_Lag1XHour9	1.862e-01	2.793e-02	6.668
RentedBikeCount_Lag1XHour10	1.674e-01	7.202e-02	2.325
RentedBikeCount_Lag1XHour12	2.351e-01	8.407e-02	2.796
RentedBikeCount_Lag1XHour13	1.979e-01	8.118e-02	2.438
RentedBikeCount_Lag1XHour14	2.505e-01	8.600e-02	2.913
RentedBikeCount_Lag1XHour15	4.933e-01	4.415e-02	11.173
RentedBikeCount_Lag1XHour16	2.255e-01	7.239e-02	3.115
RentedBikeCount_Lag1XHour17	1.729e-01	8.637e-02	2.002
RentedBikeCount_Lag1XHour18	4.083e-01	3.914e-02	10.433
RentedBikeCount_Lag1XHour20	3.324e-01	5.890e-02	5.644
RentedBikeCount_Lag1XHour21	3.033e-01	5.591e-02	5.425
RentedBikeCount_Lag1XHour23	3.495e-01	7.313e-02	4.779
RentedBikeCount_Lag2XHour1	3.364e-01	9.122e-02	3.688
RentedBikeCount_Lag2XHour2	2.136e-01	3.204e-02	6.669
RentedBikeCount_Lag2XHour3	1.892e-01	8.714e-02	2.172
RentedBikeCount_Lag2XHour4	7.784e-02	1.218e-01	0.639
RentedBikeCount_Lag2XHour5	-3.095e-02	5.462e-02	-0.567
RentedBikeCount_Lag2XHour6	-3.522e-02	5.316e-02	-0.663
RentedBikeCount_Lag2XHour10	1.396e-01	7.067e-02	1.976
RentedBikeCount_Lag2XHour11	4.064e-01	6.017e-02	6.754
RentedBikeCount_Lag2XHour12	2.819e-01	9.812e-02	2.873
RentedBikeCount_Lag2XHour13	1.768e-01	1.210e-01	1.461
RentedBikeCount_Lag2XHour14	-1.983e-02	1.140e-01	-0.174
RentedBikeCount_Lag2XHour16	2.343e-01	1.289e-01	1.818
RentedBikeCount_Lag2XHour17	2.965e-01	1.145e-01	2.591
RentedBikeCount_Lag2XHour19	1.485e-01	8.207e-02	1.809
RentedBikeCount_Lag2XHour22	3.885e-01	8.308e-02	4.676
RentedBikeCount_Lag3XHour1	1.239e-01	1.059e-01	1.171
RentedBikeCount_Lag3XHour2	2.254e-01	9.323e-02	2.418
RentedBikeCount_Lag3XHour3	-8.238e-02	7.106e-02	-1.159
RentedBikeCount_Lag3XHour4	1.152e-01	7.083e-02	1.627
RentedBikeCount_Lag3XHour12	2.023e-01	7.708e-02	2.624
RentedBikeCount_Lag3XHour13	2.473e-01	8.117e-02	3.047

RentedBikeCount_Lag3XHour14	3.093e-01	1.098e-01	2.816
RentedBikeCount_Lag3XHour16	4.817e-02	9.747e-02	0.494
RentedBikeCount_Lag3XHour17	-8.476e-02	1.304e-01	-0.650
RentedBikeCount_Lag3XHour19	3.517e-01	1.224e-01	2.873
RentedBikeCount_Lag3XHour20	1.152e-01	9.537e-02	1.208
RentedBikeCount_Lag3XHour21	2.131e-01	6.852e-02	3.110
RentedBikeCount_Lag3XHour22	-2.308e-03	1.159e-01	-0.020
RentedBikeCount_Lag3XHour23	-3.638e-03	1.036e-01	-0.035
RentedBikeCount_Lag4XHour2	-1.768e-01	1.573e-01	-1.124
RentedBikeCount_Lag4XHour3	1.096e-01	9.241e-02	1.186
RentedBikeCount_Lag4XHour11	1.498e-01	5.196e-02	2.883
RentedBikeCount_Lag4XHour14	-3.799e-02	9.728e-02	-0.391
RentedBikeCount_Lag4XHour17	1.546e-01	1.372e-01	1.128
RentedBikeCount_Lag4XHour19	2.178e-03	1.164e-01	0.019
RentedBikeCount_Lag4XHour20	-6.869e-02	1.246e-01	-0.551
RentedBikeCount_Lag4XHour21	8.155e-02	7.016e-02	1.162
RentedBikeCount_Lag4XHour22	1.714e-01	8.170e-02	2.098
RentedBikeCount_Lag4XHour23	2.524e-02	1.104e-01	0.229
RentedBikeCount_Lag5XHour2	3.598e-01	1.323e-01	2.719
RentedBikeCount_Lag5XHour3	2.538e-01	1.564e-01	1.623
RentedBikeCount_Lag5XHour4	1.311e-01	9.002e-02	1.457
RentedBikeCount_Lag5XHour5	3.348e-01	5.300e-02	6.316
RentedBikeCount_Lag5XHour9	2.010e-01	9.527e-02	2.110
RentedBikeCount_Lag5XHour10	1.908e-01	8.586e-02	2.222
RentedBikeCount_Lag5XHour14	2.142e-01	7.556e-02	2.835
RentedBikeCount_Lag5XHour15	1.336e-01	5.758e-02	2.320
RentedBikeCount_Lag5XHour17	-1.337e-02	1.149e-01	-0.116
RentedBikeCount_Lag5XHour18	4.305e-02	9.716e-02	0.443
RentedBikeCount_Lag5XHour19	-1.875e-02	1.322e-01	-0.142
RentedBikeCount_Lag5XHour20	2.279e-01	1.156e-01	1.971
RentedBikeCount_Lag5XHour23	9.106e-02	8.680e-02	1.049
RentedBikeCount_Lag6XHour1	-8.795e-04	8.721e-02	-0.010
RentedBikeCount_Lag6XHour2	-2.349e-03	9.869e-02	-0.024
RentedBikeCount_Lag6XHour3	-2.541e-04	1.335e-01	-0.002
RentedBikeCount_Lag6XHour4	1.254e-01	1.217e-01	1.031
RentedBikeCount_Lag6XHour7	2.082e-01	3.524e-02	5.908
RentedBikeCount_Lag6XHour9	3.860e-01	8.488e-02	4.548
RentedBikeCount_Lag6XHour10	7.975e-02	8.580e-02	0.929
RentedBikeCount_Lag6XHour16	6.787e-02	8.296e-02	0.818
RentedBikeCount_Lag6XHour17	7.040e-02	1.050e-01	0.670
RentedBikeCount_Lag6XHour18	1.401e-01	1.014e-01	1.382
RentedBikeCount_Lag6XHour19	8.412e-02	1.363e-01	0.617
RentedBikeCount_Lag6XHour20	2.001e-01	7.286e-02	2.746

RentedBikeCount_Lag6XHour22	3.464e-02	9.860e-02	0.351
RentedBikeCount_Lag6XHour23	6.448e-02	1.038e-01	0.621
RentedBikeCount_Lag7XHour1	2.577e-01	6.738e-02	3.825
RentedBikeCount_Lag7XHour3	6.320e-02	9.001e-02	0.702
RentedBikeCount_Lag7XHour8	3.780e-01	3.450e-02	10.956
RentedBikeCount_Lag7XHour11	2.108e-01	3.938e-02	5.351
RentedBikeCount_Lag7XHour15	-5.109e-02	8.399e-02	-0.608
RentedBikeCount_Lag7XHour16	1.071e-01	1.060e-01	1.010
RentedBikeCount_Lag7XHour19	2.099e-02	1.180e-01	0.178
RentedBikeCount_Lag7XHour21	-8.317e-02	1.153e-01	-0.722
RentedBikeCount_Lag7XHour22	7.057e-02	1.164e-01	0.606
RentedBikeCount_Lag7XHour23	-8.180e-02	1.235e-01	-0.662
RentedBikeCount_Lag8XHour4	9.449e-02	1.019e-01	0.927
RentedBikeCount_Lag8XHour5	3.439e-01	9.364e-02	3.672
RentedBikeCount_Lag8XHour6	3.006e-01	1.077e-01	2.791
RentedBikeCount_Lag8XHour10	7.497e-02	9.770e-02	0.767
RentedBikeCount_Lag8XHour15	1.506e-01	8.178e-02	1.841
RentedBikeCount_Lag8XHour16	6.405e-02	5.348e-02	1.198
RentedBikeCount_Lag8XHour17	2.632e-02	9.737e-02	0.270
RentedBikeCount_Lag8XHour19	5.489e-02	1.100e-01	0.499
RentedBikeCount_Lag8XHour21	2.875e-01	9.709e-02	2.961
RentedBikeCount_Lag8XHour22	1.240e-01	1.289e-01	0.962
RentedBikeCount_Lag8XHour23	3.308e-01	8.409e-02	3.934
RentedBikeCount_Lag9XHour2	1.152e-01	4.532e-02	2.543
RentedBikeCount_Lag9XHour4	5.159e-02	8.168e-02	0.632
RentedBikeCount_Lag9XHour5	-6.118e-02	8.878e-02	-0.689
RentedBikeCount_Lag9XHour6	-7.286e-02	1.029e-01	-0.708
RentedBikeCount_Lag9XHour7	1.130e-01	2.453e-02	4.606
RentedBikeCount_Lag9XHour8	3.334e-02	2.438e-02	1.367
RentedBikeCount_Lag9XHour10	1.401e-01	7.604e-02	1.842
RentedBikeCount_Lag9XHour13	1.093e-01	3.913e-02	2.792
RentedBikeCount_Lag9XHour17	1.542e-01	5.461e-02	2.824
RentedBikeCount_Lag9XHour18	2.162e-01	4.289e-02	5.041
RentedBikeCount_Lag9XHour19	1.318e-01	7.457e-02	1.767
RentedBikeCount_Lag9XHour22	7.377e-03	9.448e-02	0.078
TemperatureXIIsWinter	1.332e-02	4.429e-03	3.008
TemperatureXIIsSummer	-6.229e-03	4.521e-03	-1.378
TemperatureXIIsAutumn	-7.044e-03	4.231e-03	-1.665
WindSpeedXIIsSummer	2.403e-02	1.464e-02	1.641
VisibilityXIIsAutumn	-6.875e-06	1.951e-05	-0.352
DewPointTempXIIsWinter	1.103e-03	3.235e-03	0.341
DewPointTempXIIsSummer	3.045e-03	3.383e-03	0.900
DewPointTempXIIsAutumn	3.211e-03	3.225e-03	0.996

SolarRadiationXI	IsWinter	1.667e-02	3.516e-02	0.474
SolarRadiationXI	IsSummer	-4.159e-02	3.168e-02	-1.313
SolarRadiationXI	IsAutumn	4.314e-02	2.509e-02	1.719
RainfallXI	IsWinter	-6.954e-02	3.398e-02	-2.047
RainfallXI	IsSummer	8.131e-03	1.446e-02	0.562
RainfallXI	IsAutumn	2.271e-02	1.576e-02	1.441
IsHolidayXI	IsWinter	2.721e-03	7.009e-02	0.039
IsHolidayXI	IsSummer	-6.918e-02	9.149e-02	-0.756
IsHolidayXI	IsAutumn	-7.995e-02	7.443e-02	-1.074
Hour1XI	IsWinter	2.654e-01	8.069e-02	3.289
Hour1XI	IsAutumn	1.251e-01	5.844e-02	2.141
Hour2XI	IsWinter	8.506e-02	8.125e-02	1.047
Hour2XI	IsAutumn	5.643e-02	6.066e-02	0.930
Hour3XI	IsSummer	-1.851e-01	8.018e-02	-2.309
Hour3XI	IsAutumn	5.130e-02	6.367e-02	0.806
Hour4XI	IsWinter	1.198e-01	8.155e-02	1.469
Hour4XI	IsSummer	-7.861e-02	8.001e-02	-0.983
Hour4XI	IsAutumn	1.162e-01	6.592e-02	1.763
Hour5XI	IsWinter	5.126e-02	7.982e-02	0.642
Hour5XI	IsAutumn	2.476e-02	6.067e-02	0.408
Hour6XI	IsWinter	-6.426e-02	8.249e-02	-0.779
Hour6XI	IsSummer	-2.287e-01	8.032e-02	-2.848
Hour6XI	IsAutumn	2.779e-02	6.569e-02	0.423
Hour7XI	IsWinter	-6.817e-02	8.453e-02	-0.806
Hour7XI	IsSummer	-2.868e-01	8.097e-02	-3.542
Hour7XI	IsAutumn	-9.317e-02	6.819e-02	-1.366
Hour8XI	IsWinter	1.852e-01	8.316e-02	2.227
Hour8XI	IsSummer	-8.812e-02	7.932e-02	-1.111
Hour8XI	IsAutumn	-9.650e-02	6.695e-02	-1.441
Hour9XI	IsWinter	-7.544e-02	8.539e-02	-0.883
Hour9XI	IsSummer	-2.935e-01	8.550e-02	-3.432
Hour9XI	IsAutumn	-1.844e-01	6.495e-02	-2.840
Hour10XI	IsWinter	-1.466e-01	8.609e-02	-1.703
Hour10XI	IsSummer	-3.951e-01	9.434e-02	-4.188
Hour10XI	IsAutumn	-1.473e-01	6.583e-02	-2.238
Hour11XI	IsWinter	7.525e-02	8.850e-02	0.850
Hour11XI	IsSummer	-3.418e-01	1.008e-01	-3.391
Hour11XI	IsAutumn	-1.657e-01	6.543e-02	-2.532
Hour12XI	IsSummer	-2.451e-01	9.955e-02	-2.462
Hour12XI	IsAutumn	-5.194e-02	6.346e-02	-0.818
Hour13XI	IsWinter	1.983e-02	9.244e-02	0.214
Hour13XI	IsSummer	-1.384e-01	1.017e-01	-1.362
Hour13XI	IsAutumn	6.728e-03	6.576e-02	0.102

Hour14XIIsSummer	-1.752e-01	8.972e-02	-1.953
Hour15XIIsWinter	2.317e-02	8.336e-02	0.278
Hour15XIIsSummer	5.763e-02	8.790e-02	0.656
Hour16XIIsWinter	1.491e-02	8.705e-02	0.171
Hour16XIIsSummer	-2.284e-01	9.442e-02	-2.419
Hour16XIIsAutumn	-6.917e-02	6.601e-02	-1.048
Hour17XIIsWinter	1.111e-01	8.636e-02	1.286
Hour17XIIsSummer	-1.893e-01	9.088e-02	-2.083
Hour17XIIsAutumn	1.043e-01	7.054e-02	1.478
Hour18XIIsSummer	-3.302e-01	8.311e-02	-3.973
Hour18XIIsAutumn	-8.931e-02	6.629e-02	-1.347
Hour19XIIsWinter	1.653e-01	8.478e-02	1.950
Hour19XIIsSummer	-1.896e-01	8.652e-02	-2.191
Hour19XIIsAutumn	1.462e-01	6.886e-02	2.124
Hour20XIIsWinter	1.233e-01	7.971e-02	1.547
Hour20XIIsSummer	-2.244e-01	7.832e-02	-2.865
Hour21XIIsWinter	5.056e-02	8.326e-02	0.607
Hour21XIIsSummer	-2.767e-01	8.429e-02	-3.283
Hour21XIIsAutumn	-4.494e-02	6.215e-02	-0.723
Hour22XIIsSummer	-1.598e-01	8.129e-02	-1.966
Hour22XIIsAutumn	2.963e-02	5.969e-02	0.496
Hour23XIIsWinter	1.875e-01	8.148e-02	2.301
Hour23XIIsSummer	-2.001e-01	8.001e-02	-2.500
Hour23XIIsAutumn	5.270e-02	6.013e-02	0.876
RentedBikeCount_Lag1XIIsAutumn	3.216e-02	1.091e-02	2.947
RentedBikeCount_Lag3XIIsWinter	-5.341e-02	1.692e-02	-3.156
RentedBikeCount_Lag3XIIsSummer	6.452e-02	2.396e-02	2.693
RentedBikeCount_Lag5XIIsSummer	-1.077e-02	3.970e-02	-0.271
RentedBikeCount_Lag6XIIsSummer	-1.254e-02	3.277e-02	-0.383
RentedBikeCount_Lag6XIIsAutumn	-3.893e-02	1.634e-02	-2.382
RentedBikeCount_Lag8XIIsAutumn	2.423e-02	1.450e-02	1.671
RentedBikeCount_Lag9XIIsWinter	2.739e-02	1.617e-02	1.693
Pr(> t )			
(Intercept)	< 2e-16	***	
Humidity	0.116195		
Visibility	0.008707	**	
SolarRadiation	0.017615	*	
Rainfall	< 2e-16	***	
Hour1	< 2e-16	***	
Hour2	< 2e-16	***	
Hour3	< 2e-16	***	
Hour4	< 2e-16	***	
Hour5	< 2e-16	***	

Hour6	< 2e-16 ***
Hour7	< 2e-16 ***
Hour8	< 2e-16 ***
Hour9	< 2e-16 ***
Hour10	< 2e-16 ***
Hour11	< 2e-16 ***
Hour12	< 2e-16 ***
Hour13	< 2e-16 ***
Hour14	< 2e-16 ***
Hour15	< 2e-16 ***
Hour16	< 2e-16 ***
Hour17	< 2e-16 ***
Hour18	< 2e-16 ***
Hour19	< 2e-16 ***
Hour20	< 2e-16 ***
Hour21	< 2e-16 ***
Hour22	< 2e-16 ***
Hour23	< 2e-16 ***
IsAutumn	0.707461
RentedBikeCount_Lag1	< 2e-16 ***
RentedBikeCount_Lag5	0.102241
RentedBikeCount_Lag6	0.193036
RentedBikeCount_Lag7	4.14e-05 ***
RentedBikeCount_Lag8	1.27e-06 ***
RentedBikeCount_Lag9	0.157434
HumidityXVisibility	0.413640
HumidityXSolarRadiation	0.018427 *
HumidityXRentedBikeCount_Lag1	0.001669 **
HumidityXRentedBikeCount_Lag2	0.003451 **
HumidityXRentedBikeCount_Lag6	0.919479
HumidityXRentedBikeCount_Lag9	0.003166 **
TemperatureXDewPointTemp	0.865579
TemperatureXSolarRadiation	0.635832
TemperatureXRentedBikeCount_Lag1	8.74e-07 ***
TemperatureXRentedBikeCount_Lag3	0.771263
WindSpeedXDewPointTemp	0.460516
WindSpeedXRainfall	0.239580
WindSpeedXSnowfall	0.846755
WindSpeedXIsHoliday	0.931512
WindSpeedXRentedBikeCount_Lag1	0.914745
VisibilityXDewPointTemp	0.761999
VisibilityXRainfall	4.60e-08 ***
VisibilityXSnowfall	0.447605

VisibilityXIsHoliday	0.717725
VisibilityXRentedBikeCount_Lag7	3.40e-05 ***
DewPointTempXRainfall	0.052249 .
DewPointTempXSnowfall	0.970403
DewPointTempXIsHoliday	0.120769
DewPointTempXRentedBikeCount_Lag3	0.762838
SolarRadiationXRainfall	0.018025 *
SolarRadiationXIsHoliday	0.170795
SolarRadiationXRentedBikeCount_Lag1	0.005778 **
SolarRadiationXRentedBikeCount_Lag2	0.110288
SolarRadiationXRentedBikeCount_Lag4	0.477536
SolarRadiationXRentedBikeCount_Lag5	0.002507 **
SolarRadiationXRentedBikeCount_Lag9	0.036334 *
RainfallXSnowfall	0.938787
RainfallXIsHoliday	0.152566
RainfallXRentedBikeCount_Lag1	< 2e-16 ***
RainfallXRentedBikeCount_Lag2	0.057935 .
RainfallXRentedBikeCount_Lag4	0.542023
RainfallXRentedBikeCount_Lag8	0.000106 ***
SnowfallXIsHoliday	0.339375
SnowfallXRentedBikeCount_Lag2	0.080066 .
SnowfallXRentedBikeCount_Lag9	0.158075
IsHolidayXRentedBikeCount_Lag1	0.747623
IsHolidayXRentedBikeCount_Lag4	0.087402 .
RentedBikeCount_Lag1XRentedBikeCount_Lag2	4.01e-05 ***
RentedBikeCount_Lag1XRentedBikeCount_Lag7	0.000141 ***
RentedBikeCount_Lag1XRentedBikeCount_Lag8	0.482396
RentedBikeCount_Lag1XRentedBikeCount_Lag9	0.094173 .
RentedBikeCount_Lag2XRentedBikeCount_Lag3	2.47e-05 ***
RentedBikeCount_Lag3XRentedBikeCount_Lag4	0.722528
RentedBikeCount_Lag3XRentedBikeCount_Lag5	0.256751
RentedBikeCount_Lag4XRentedBikeCount_Lag5	0.682483
RentedBikeCount_Lag4XRentedBikeCount_Lag9	0.937771
RentedBikeCount_Lag5XRentedBikeCount_Lag9	0.377181
RentedBikeCount_Lag6XRentedBikeCount_Lag8	0.957730
RentedBikeCount_Lag6XRentedBikeCount_Lag9	0.700220
RentedBikeCount_Lag7XRentedBikeCount_Lag8	0.001094 **
HumidityXHour1	2.08e-05 ***
HumidityXHour2	0.000135 ***
HumidityXHour3	5.56e-05 ***
HumidityXHour4	2.77e-05 ***
HumidityXHour5	1.04e-05 ***
HumidityXHour6	1.39e-06 ***

HumidityXHour7	1.75e-06 ***
HumidityXHour8	0.002325 **
HumidityXHour9	0.006581 **
HumidityXHour10	0.000445 ***
HumidityXHour11	0.006024 **
HumidityXHour12	0.301505
HumidityXHour13	0.001998 **
HumidityXHour14	0.253194
HumidityXHour15	0.573924
HumidityXHour16	0.120473
HumidityXHour17	0.018767 *
HumidityXHour18	0.260158
HumidityXHour19	0.001682 **
HumidityXHour20	0.004201 **
HumidityXHour21	1.49e-06 ***
HumidityXHour22	0.000172 ***
HumidityXHour23	2.77e-05 ***
TemperatureXHour1	< 2e-16 ***
TemperatureXHour2	< 2e-16 ***
TemperatureXHour3	1.30e-13 ***
TemperatureXHour4	1.79e-10 ***
TemperatureXHour5	1.99e-12 ***
TemperatureXHour6	7.66e-13 ***
TemperatureXHour7	< 2e-16 ***
TemperatureXHour8	1.46e-15 ***
TemperatureXHour9	< 2e-16 ***
TemperatureXHour10	1.35e-12 ***
TemperatureXHour11	1.29e-09 ***
TemperatureXHour12	2.39e-11 ***
TemperatureXHour13	0.875201
TemperatureXHour14	1.27e-14 ***
TemperatureXHour15	5.58e-15 ***
TemperatureXHour16	5.59e-09 ***
TemperatureXHour17	0.447455
TemperatureXHour18	5.67e-05 ***
TemperatureXHour19	3.21e-11 ***
TemperatureXHour20	9.25e-10 ***
TemperatureXHour21	1.97e-15 ***
TemperatureXHour22	< 2e-16 ***
TemperatureXHour23	1.12e-08 ***
WindSpeedXHour1	0.412601
WindSpeedXHour2	0.273401
WindSpeedXHour3	0.496516

WindSpeedXHour4	0.240151
WindSpeedXHour5	0.052744 .
WindSpeedXHour6	0.740532
WindSpeedXHour7	0.619057
WindSpeedXHour9	0.594112
WindSpeedXHour10	0.361360
WindSpeedXHour11	0.145457
WindSpeedXHour12	0.175380
WindSpeedXHour13	0.132162
WindSpeedXHour14	0.297687
WindSpeedXHour15	0.274397
WindSpeedXHour16	0.932167
WindSpeedXHour17	0.939458
WindSpeedXHour19	0.354584
WindSpeedXHour20	0.384325
WindSpeedXHour21	0.150734
WindSpeedXHour22	0.479480
VisibilityXHour1	0.636699
VisibilityXHour2	0.681787
VisibilityXHour3	0.849955
VisibilityXHour4	0.432689
VisibilityXHour7	0.836689
VisibilityXHour8	0.550876
VisibilityXHour9	0.796199
VisibilityXHour10	0.712212
VisibilityXHour11	0.696764
VisibilityXHour12	0.417439
VisibilityXHour14	0.866032
VisibilityXHour16	0.791810
VisibilityXHour17	0.881867
VisibilityXHour19	0.542823
VisibilityXHour20	0.327447
VisibilityXHour21	0.742625
VisibilityXHour22	0.772537
DewPointTempXHour13	0.036565 *
DewPointTempXHour17	0.292138
DewPointTempXHour18	0.024442 *
SolarRadiationXHour6	0.223966
SolarRadiationXHour7	0.509164
SolarRadiationXHour8	0.207464
SolarRadiationXHour9	0.017895 *
SolarRadiationXHour14	0.768644
SolarRadiationXHour16	0.460561

SolarRadiationXHour17	0.879255
SolarRadiationXHour18	0.252856
SolarRadiationXHour19	0.013862 *
Rainfall1XHour1	2.90e-14 ***
Rainfall1XHour2	< 2e-16 ***
Rainfall1XHour3	1.60e-15 ***
Rainfall1XHour4	< 2e-16 ***
Rainfall1XHour5	1.20e-05 ***
Rainfall1XHour6	3.03e-11 ***
Rainfall1XHour7	< 2e-16 ***
Rainfall1XHour8	< 2e-16 ***
Rainfall1XHour9	< 2e-16 ***
Rainfall1XHour10	4.05e-11 ***
Rainfall1XHour11	< 2e-16 ***
Rainfall1XHour12	< 2e-16 ***
Rainfall1XHour13	< 2e-16 ***
Rainfall1XHour14	< 2e-16 ***
Rainfall1XHour15	< 2e-16 ***
Rainfall1XHour16	5.16e-10 ***
Rainfall1XHour17	1.21e-06 ***
Rainfall1XHour18	< 2e-16 ***
Rainfall1XHour19	1.04e-12 ***
Rainfall1XHour20	< 2e-16 ***
Rainfall1XHour21	< 2e-16 ***
Rainfall1XHour22	2.21e-11 ***
Rainfall1XHour23	4.59e-16 ***
Snowfall1XHour1	0.192934
Snowfall1XHour2	0.688143
Snowfall1XHour4	0.480420
Snowfall1XHour5	0.574409
Snowfall1XHour6	0.453444
Snowfall1XHour7	0.736573
Snowfall1XHour9	0.129056
Snowfall1XHour11	0.112619
Snowfall1XHour12	0.032933 *
Snowfall1XHour14	0.118610
Snowfall1XHour16	0.191966
Snowfall1XHour17	0.700954
Snowfall1XHour18	0.000966 ***
Snowfall1XHour19	0.659195
Snowfall1XHour20	0.336365
Snowfall1XHour21	0.909584
Snowfall1XHour22	0.582777

SnowfallXHour23	0.728554
IsHolidayXHour1	0.029670 *
IsHolidayXHour2	0.018419 *
IsHolidayXHour3	0.085832 .
IsHolidayXHour4	0.591568
IsHolidayXHour5	0.077360 .
IsHolidayXHour6	0.512392
IsHolidayXHour7	0.292832
IsHolidayXHour8	0.449418
IsHolidayXHour10	0.243564
IsHolidayXHour11	0.583787
IsHolidayXHour12	0.924628
IsHolidayXHour13	0.672648
IsHolidayXHour14	0.379079
IsHolidayXHour15	0.773027
IsHolidayXHour16	0.925278
IsHolidayXHour17	0.807002
IsHolidayXHour18	0.696174
IsHolidayXHour19	0.027257 *
IsHolidayXHour20	0.162263
IsHolidayXHour21	0.138564
IsHolidayXHour23	0.127257
RentedBikeCount_Lag1XHour3	0.028253 *
RentedBikeCount_Lag1XHour4	0.434954
RentedBikeCount_Lag1XHour6	< 2e-16 ***
RentedBikeCount_Lag1XHour7	< 2e-16 ***
RentedBikeCount_Lag1XHour8	< 2e-16 ***
RentedBikeCount_Lag1XHour9	2.75e-11 ***
RentedBikeCount_Lag1XHour10	0.020087 *
RentedBikeCount_Lag1XHour12	0.005185 **
RentedBikeCount_Lag1XHour13	0.014774 *
RentedBikeCount_Lag1XHour14	0.003586 **
RentedBikeCount_Lag1XHour15	< 2e-16 ***
RentedBikeCount_Lag1XHour16	0.001846 **
RentedBikeCount_Lag1XHour17	0.045292 *
RentedBikeCount_Lag1XHour18	< 2e-16 ***
RentedBikeCount_Lag1XHour20	1.72e-08 ***
RentedBikeCount_Lag1XHour21	5.95e-08 ***
RentedBikeCount_Lag1XHour23	1.80e-06 ***
RentedBikeCount_Lag2XHour1	0.000228 ***
RentedBikeCount_Lag2XHour2	2.75e-11 ***
RentedBikeCount_Lag2XHour3	0.029914 *
RentedBikeCount_Lag2XHour4	0.522813

RentedBikeCount_Lag2XHour5	0.570929
RentedBikeCount_Lag2XHour6	0.507586
RentedBikeCount_Lag2XHour10	0.048182 *
RentedBikeCount_Lag2XHour11	1.53e-11 ***
RentedBikeCount_Lag2XHour12	0.004076 **
RentedBikeCount_Lag2XHour13	0.143979
RentedBikeCount_Lag2XHour14	0.861865
RentedBikeCount_Lag2XHour16	0.069117 .
RentedBikeCount_Lag2XHour17	0.009594 **
RentedBikeCount_Lag2XHour19	0.070522 .
RentedBikeCount_Lag2XHour22	2.98e-06 ***
RentedBikeCount_Lag3XHour1	0.241823
RentedBikeCount_Lag3XHour2	0.015626 *
RentedBikeCount_Lag3XHour3	0.246323
RentedBikeCount_Lag3XHour4	0.103834
RentedBikeCount_Lag3XHour12	0.008713 **
RentedBikeCount_Lag3XHour13	0.002321 **
RentedBikeCount_Lag3XHour14	0.004868 **
RentedBikeCount_Lag3XHour16	0.621210
RentedBikeCount_Lag3XHour17	0.515663
RentedBikeCount_Lag3XHour19	0.004079 **
RentedBikeCount_Lag3XHour20	0.227117
RentedBikeCount_Lag3XHour21	0.001878 **
RentedBikeCount_Lag3XHour22	0.984110
RentedBikeCount_Lag3XHour23	0.971997
RentedBikeCount_Lag4Xhour2	0.261141
RentedBikeCount_Lag4Xhour3	0.235791
RentedBikeCount_Lag4Xhour11	0.003949 **
RentedBikeCount_Lag4Xhour14	0.696158
RentedBikeCount_Lag4Xhour17	0.259553
RentedBikeCount_Lag4Xhour19	0.985073
RentedBikeCount_Lag4Xhour20	0.581551
RentedBikeCount_Lag4Xhour21	0.245116
RentedBikeCount_Lag4Xhour22	0.035917 *
RentedBikeCount_Lag4Xhour23	0.819191
RentedBikeCount_Lag5Xhour2	0.006562 **
RentedBikeCount_Lag5Xhour3	0.104584
RentedBikeCount_Lag5Xhour4	0.145246
RentedBikeCount_Lag5Xhour5	2.82e-10 ***
RentedBikeCount_Lag5Xhour9	0.034910 *
RentedBikeCount_Lag5Xhour10	0.026280 *
RentedBikeCount_Lag5Xhour14	0.004595 **
RentedBikeCount_Lag5Xhour15	0.020347 *

RentedBikeCount_Lag5XHour17	0.907303
RentedBikeCount_Lag5XHour18	0.657732
RentedBikeCount_Lag5XHour19	0.887261
RentedBikeCount_Lag5XHour20	0.048705 *
RentedBikeCount_Lag5XHour23	0.294132
RentedBikeCount_Lag6XHour1	0.991954
RentedBikeCount_Lag6XHour2	0.981014
RentedBikeCount_Lag6XHour3	0.998481
RentedBikeCount_Lag6XHour4	0.302667
RentedBikeCount_Lag6XHour7	3.61e-09 ***
RentedBikeCount_Lag6XHour9	5.49e-06 ***
RentedBikeCount_Lag6XHour10	0.352681
RentedBikeCount_Lag6XHour16	0.413331
RentedBikeCount_Lag6XHour17	0.502717
RentedBikeCount_Lag6XHour18	0.167041
RentedBikeCount_Lag6XHour19	0.537118
RentedBikeCount_Lag6XHour20	0.006044 **
RentedBikeCount_Lag6XHour22	0.725359
RentedBikeCount_Lag6XHour23	0.534637
RentedBikeCount_Lag7XHour1	0.000132 ***
RentedBikeCount_Lag7XHour3	0.482646
RentedBikeCount_Lag7XHour8	< 2e-16 ***
RentedBikeCount_Lag7XHour11	8.96e-08 ***
RentedBikeCount_Lag7XHour15	0.543024
RentedBikeCount_Lag7XHour16	0.312543
RentedBikeCount_Lag7XHour19	0.858819
RentedBikeCount_Lag7XHour21	0.470619
RentedBikeCount_Lag7XHour22	0.544226
RentedBikeCount_Lag7XHour23	0.507690
RentedBikeCount_Lag8XHour4	0.353787
RentedBikeCount_Lag8XHour5	0.000242 ***
RentedBikeCount_Lag8XHour6	0.005268 **
RentedBikeCount_Lag8XHour10	0.442893
RentedBikeCount_Lag8XHour15	0.065638 .
RentedBikeCount_Lag8XHour16	0.231075
RentedBikeCount_Lag8XHour17	0.786906
RentedBikeCount_Lag8XHour19	0.617799
RentedBikeCount_Lag8XHour21	0.003074 **
RentedBikeCount_Lag8XHour22	0.336150
RentedBikeCount_Lag8XHour23	8.43e-05 ***
RentedBikeCount_Lag9XHour2	0.011022 *
RentedBikeCount_Lag9XHour4	0.527671
RentedBikeCount_Lag9XHour5	0.490759

RentedBikeCount_Lag9XHour6	0.478905
RentedBikeCount_Lag9XHour7	4.17e-06 ***
RentedBikeCount_Lag9XHour8	0.171574
RentedBikeCount_Lag9XHour10	0.065455 .
RentedBikeCount_Lag9XHour13	0.005244 **
RentedBikeCount_Lag9XHour17	0.004749 **
RentedBikeCount_Lag9XHour18	4.73e-07 ***
RentedBikeCount_Lag9XHour19	0.077271 .
RentedBikeCount_Lag9XHour22	0.937770
TemperatureXIIsWinter	0.002634 **
TemperatureXIIsSummer	0.168304
TemperatureXIIsAutumn	0.095952 .
WindSpeedXIIsSummer	0.100768
VisibilityXIIsAutumn	0.724541
DewPointTempXIIsWinter	0.733097
DewPointTempXIIsSummer	0.368112
DewPointTempXIIsAutumn	0.319332
SolarRadiationXIIsWinter	0.635474
SolarRadiationXIIsSummer	0.189353
SolarRadiationXIIsAutumn	0.085637 .
RainfallXIIsWinter	0.040723 *
RainfallXIIsSummer	0.573893
RainfallXIIsAutumn	0.149629
IsHolidayXIIsWinter	0.969031
IsHolidayXIIsSummer	0.449595
IsHolidayXIIsAutumn	0.282814
Hour1XIIsWinter	0.001009 **
Hour1XIIsAutumn	0.032338 *
Hour2XIIsWinter	0.295181
Hour2XIIsAutumn	0.352264
Hour3XIIsSummer	0.020955 *
Hour3XIIsAutumn	0.420441
Hour4XIIsWinter	0.141884
Hour4XIIsSummer	0.325859
Hour4XIIsAutumn	0.077950 .
Hour5XIIsWinter	0.520716
Hour5XIIsAutumn	0.683191
Hour6XIIsWinter	0.435966
Hour6XIIsSummer	0.004411 **
Hour6XIIsAutumn	0.672324
Hour7XIIsWinter	0.420029
Hour7XIIsSummer	0.000400 ***
Hour7XIIsAutumn	0.171883

Hour8XIIsWinter	0.025967 *
Hour8XIIsSummer	0.266637
Hour8XIIsAutumn	0.149533
Hour9XIIsWinter	0.377037
Hour9XIIsSummer	0.000601 ***
Hour9XIIsAutumn	0.004525 **
Hour10XIIsWinter	0.088615 .
Hour10XIIsSummer	2.84e-05 ***
Hour10XIIsAutumn	0.025228 *
Hour11XIIsWinter	0.395224
Hour11XIIsSummer	0.000700 ***
Hour11XIIsAutumn	0.011345 *
Hour12XIIsSummer	0.013840 *
Hour12XIIsAutumn	0.413145
Hour13XIIsWinter	0.830181
Hour13XIIsSummer	0.173376
Hour13XIIsAutumn	0.918505
Hour14XIIsSummer	0.050873 .
Hour15XIIsWinter	0.781101
Hour15XIIsSummer	0.512121
Hour16XIIsWinter	0.864025
Hour16XIIsSummer	0.015602 *
Hour16XIIsAutumn	0.294736
Hour17XIIsWinter	0.198319
Hour17XIIsSummer	0.037281 *
Hour17XIIsAutumn	0.139369
Hour18XIIsSummer	7.17e-05 ***
Hour18XIIsAutumn	0.177935
Hour19XIIsWinter	0.051170 .
Hour19XIIsSummer	0.028448 *
Hour19XIIsAutumn	0.033736 *
Hour20XIIsWinter	0.121979
Hour20XIIsSummer	0.004175 **
Hour21XIIsWinter	0.543689
Hour21XIIsSummer	0.001031 **
Hour21XIIsAutumn	0.469648
Hour22XIIsSummer	0.049302 *
Hour22XIIsAutumn	0.619597
Hour23XIIsWinter	0.021412 *
Hour23XIIsSummer	0.012424 *
Hour23XIIsAutumn	0.380842
RentedBikeCount_Lag1XIIsAutumn	0.003220 **
RentedBikeCount_Lag3XIIsWinter	0.001606 **

```

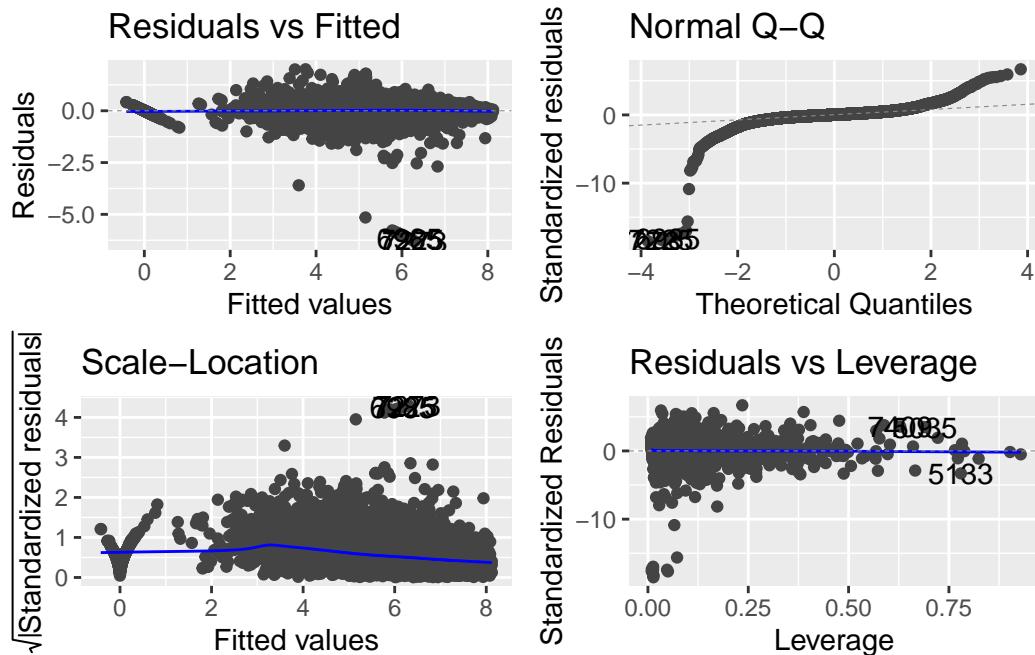
RentedBikeCount_Lag3XIsSummer      0.007097  **
RentedBikeCount_Lag5XIsSummer       0.786183
RentedBikeCount_Lag6XIsSummer       0.702030
RentedBikeCount_Lag6XIsAutumn      0.017253  *
RentedBikeCount_Lag8XIsAutumn      0.094779  .
RentedBikeCount_Lag9XIsWinter      0.090409  .

---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

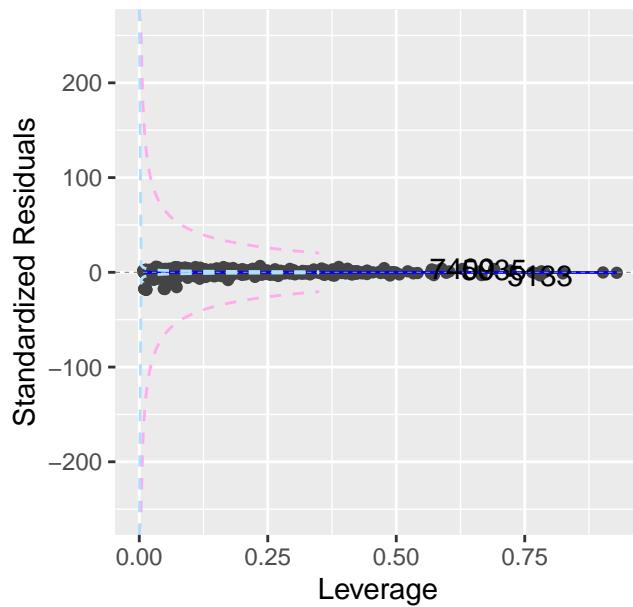
Residual standard error: 0.3424 on 8305 degrees of freedom  
(9 observations deleted due to missingness)  
Multiple R-squared: 0.9554, Adjusted R-squared: 0.953  
F-statistic: 399.9 on 445 and 8305 DF, p-value: < 2.2e-16

```
autoplot(seoul.bike.elastic.log)
```



```
show_leverage(seoul.bike.elastic.log)
```

Residuals vs Leverage

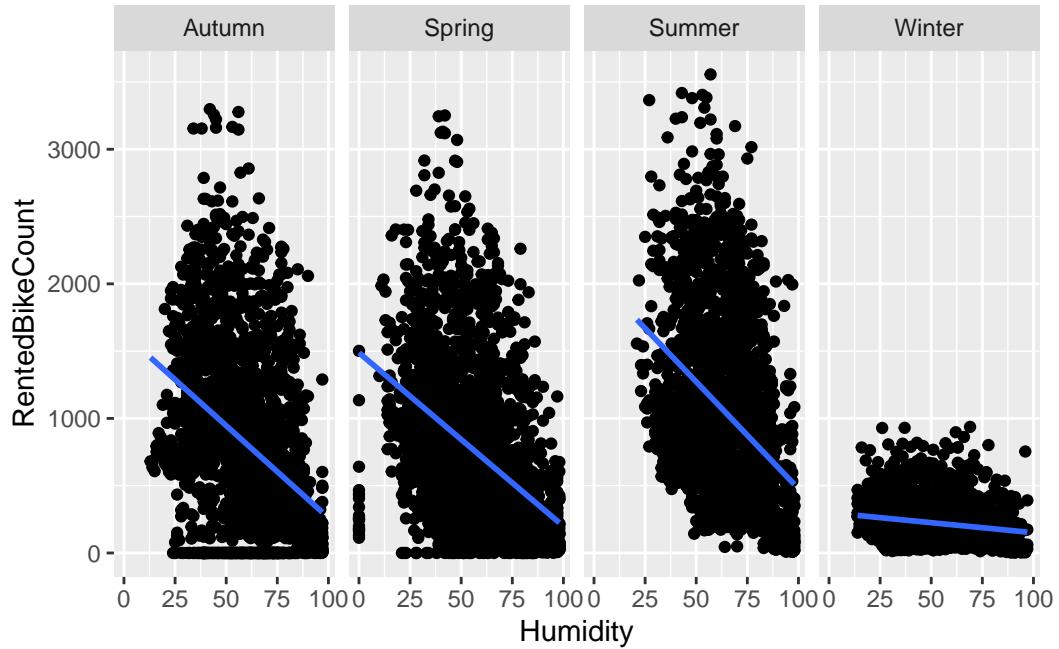


Strange trends happen in homoskedasticity when fitted values approach zero, which may be exacerbating the strange trends seen in the Residuals vs. Fitted values plot. Overall, the model assumptions did not approve with a log transformation.

### A.10.1

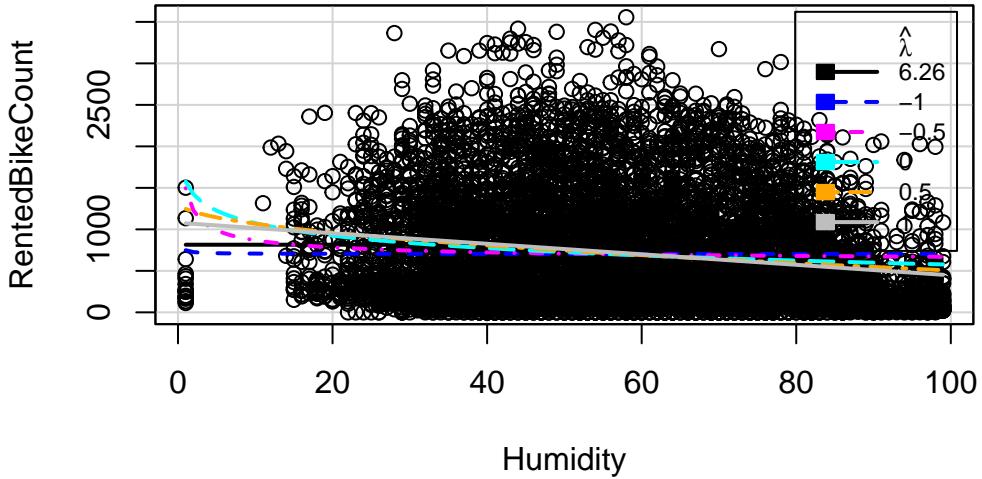
Non-linearity in the Humidity vs. # of Rented Bikes

```
seoul %>% ggplot(aes(x=Humidity, y=RentedBikeCount))+
  geom_point()+
  geom_smooth(method="lm", se=F)+
  facet_grid(~Seasons)
```



```
t = seoul %>%
  mutate(
    Humidity = Humidity + 1,
    Visibility = Visibility + 1,
    WindSpeed = WindSpeed + 1,
  )

invTranPlot(RentedBikeCount ~ Humidity, data=t,
            lambda = c(-1, -0.5, 0, 0.5, 1), optimal=T)
```



	lambda	RSS
1	6.257958	3376420282
2	-1.000000	3643900037
3	-0.500000	3627599076
4	0.000000	3572181770
5	0.500000	3529713040
6	1.000000	3498497235

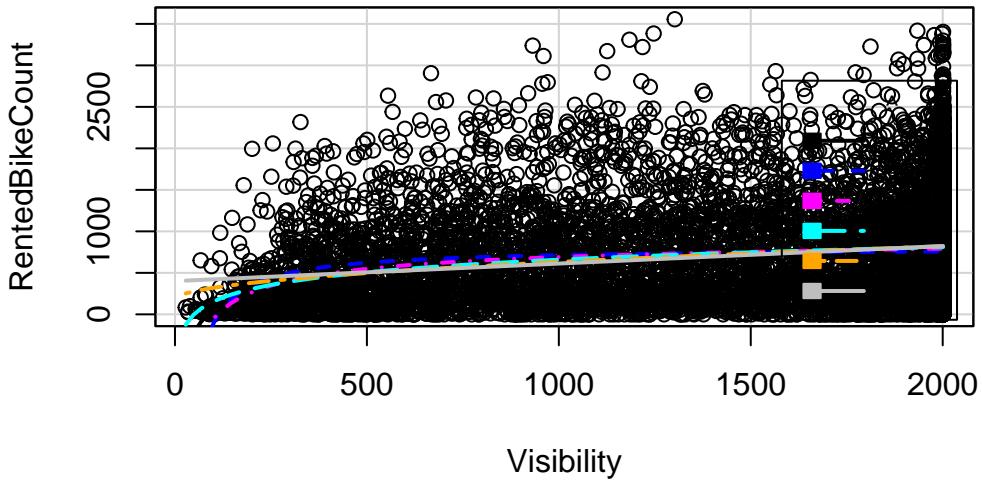
Due to the non-linearity in  $\text{Humidity}_{st}$ , and the impracticality of transforming it (a  $\lambda = 6$  is not ideally interpretable), we decided to include 9 (ommitting a first level to preserve the full rank of  $X'X$ ) levels of humidity as dummy variables to isolate non-linear effects.

Hence, we included  $\sum_{i=1}^9 \beta_i I(10i \leq \text{Humidity}_{st} < 10(i+1))$  as categorical variables.

### A.10.2

An ideal transformation for  $\text{Visibility}_{st}$

```
invTranPlot(RentedBikeCount ~ Visibility, data=t,
            lambda = c(-1, -0.5, 0, 0.5, 1), optimal=T)
```



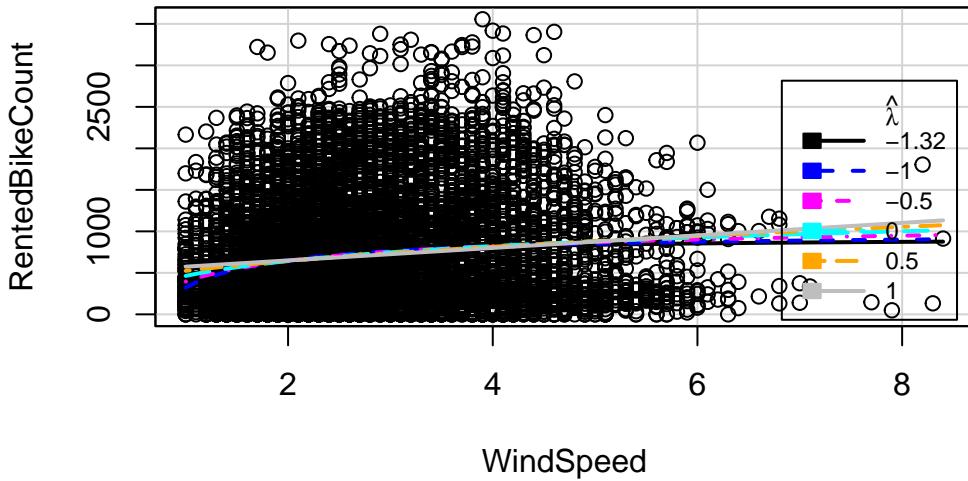
	lambda	RSS
1	-0.2416886	3464971093
2	-1.0000000	3510030146
3	-0.5000000	3469179906
4	0.0000000	3467575822
5	0.5000000	3482113896
6	1.0000000	3499224121

Based on the Inverse Response Plot, the best transformation for  $\text{Visibility}_{st}$  for interpretable results is a  $\log$  transformation ( $\lambda = 0$ ).

### A.10.3

Transforming  $\text{WindSpeed}_{st}$

```
invTranPlot(RentedBikeCount ~ WindSpeed, data=t,
            lambda = c(-1, -0.5, 0, 0.5, 1), optimal=T)
```

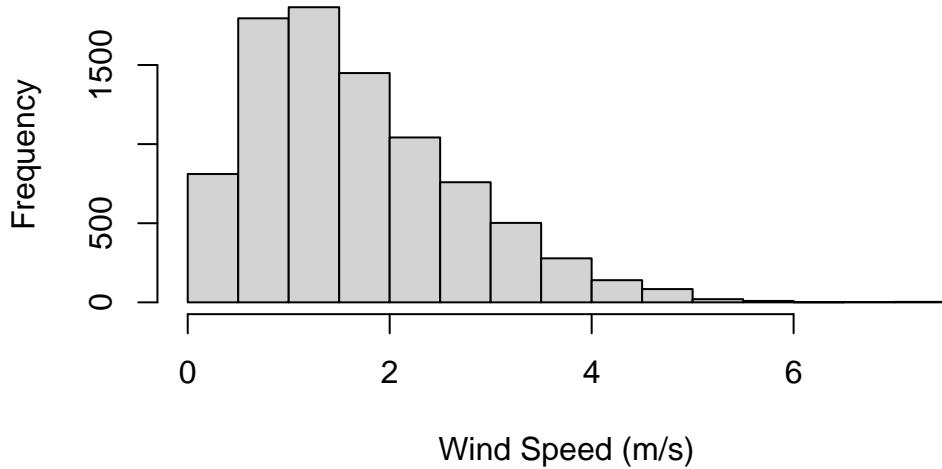


	lambda	RSS
1	-1.319359	3545185375
2	-1.000000	3546213510
3	-0.500000	3551962580
4	0.000000	3562228807
5	0.500000	3575668783
6	1.000000	3590487844

An ideal transformation for  $\text{WindSpeed}_{st}$  could be an inverse transformation. However, upon further analysis of the sample distribution of  $\text{WindSpeed}_{st}$ , there are extreme values of wind that may be skewing the results:

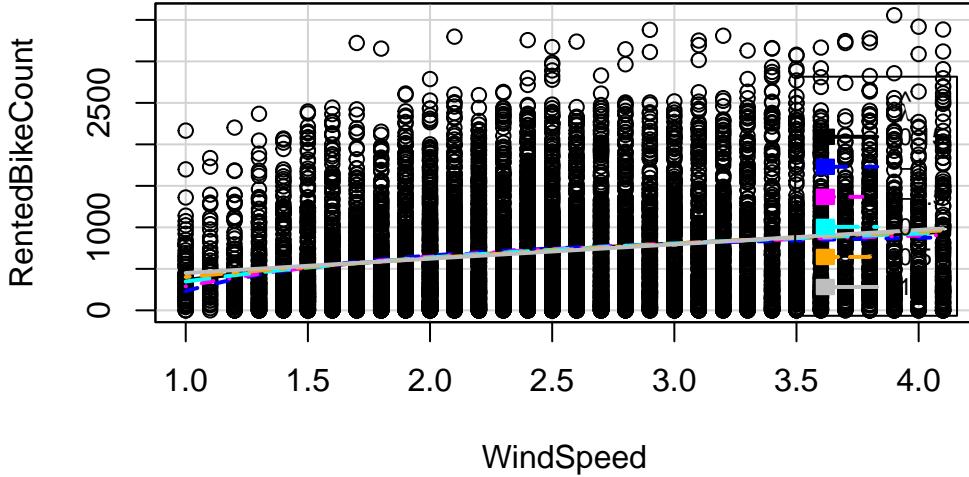
```
hist(seoul$WindSpeed, main="Histogram of Wind Speed (m/s)",
     xlab="Wind Speed (m/s)")
```

## Histogram of Wind Speed (m/s)



Hence, filtering out extreme values of wind,

```
t %>% filter(WindSpeed < quantile(WindSpeed, 0.9)) -> t  
  
invTranPlot(RentedBikeCount ~ WindSpeed, data=t,  
lambda = c(-1, -0.5, 0, 0.5, 1), optimal=T)
```



	lambda	RSS
1	0.1487667	3124846145
2	-1.0000000	3133415490
3	-0.5000000	3127536986
4	0.0000000	3124982517
5	0.5000000	3125565109
6	1.0000000	3128778666

We will apply two transformations as follows:

- (1) Define a new categorical variable called  $\text{ExtremeWind}_{st}$  that will be either 1 or 0 depending if  $\text{WindSpeed}_{st} \geq \phi(0.9|\text{Season} = s)$ , where  $\phi$  is the inverse CDF of  $F(\text{WindSpeed}_{st} \leq c)$
- (2) Transform  $\text{WindSpeed}_{st}$  such that values that classify as  $\text{ExtremeWind}_{st}$  are 0, and all other values follow a  $\log$  transformation as denoted by the inverse response plot.

This isolates the linear trend in the “non-extreme” wind-speeds, and gives the extreme wind categorical variable its own marginal effect that we can distinguish.

## A.11

Elastic net regression and output on Model (4)

```

elastic_cv <- cv.glmnet(x = seoul.bike.x,
                        y = seoul.bike.y,
                        type.measure = "mse",
                        alpha = 1)

d = coef(elastic_cv, s = "lambda.1se") [2:(length(model.bike.factors)-1)]

elastic.bike.factors = c(model.bike.factors[which(d != 0)])

#Add lower level terms
elastic.bike.factors = c(elastic.bike.factors,
                         setdiff(seoul.bike.factors.alt,
                                  c("RentedBikeCount", elastic.bike.factors)))

seoul.bike.elastic = lm(RentedBikeCount ~ .,
                        seoul.bike[c("RentedBikeCount",
                                    elastic.bike.factors)])

print(summary(seoul.bike.elastic))

```

Call:

```
lm(formula = RentedBikeCount ~ ., data = seoul.bike[c("RentedBikeCount",
                                                       elastic.bike.factors)])
```

Residuals:

Min	1Q	Median	3Q	Max
-2392.38	-35.14	1.35	38.94	1261.67

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	2.579e+02	9.417e+01	2.739
Humidity	-2.078e+00	1.059e+00	-1.963
Visibility	1.188e+01	8.938e+00	1.329
SolarRadiation	-1.088e+02	4.975e+01	-2.186
Rainfall	-3.251e+01	1.511e+01	-2.152
Hour1	-2.815e+02	1.147e+02	-2.453
Hour2	-1.267e+02	1.171e+02	-1.082
Hour3	-4.051e+02	1.246e+02	-3.252
Hour4	-2.207e+02	1.069e+02	-2.064
Hour5	-2.976e+02	4.992e+01	-5.960

Hour6	-3.166e+02	5.115e+01	-6.191
Hour7	-2.266e+02	1.100e+02	-2.061
Hour8	7.467e+01	1.185e+02	0.630
Hour9	-4.662e+00	1.252e+02	-0.037
Hour10	-2.505e+02	5.058e+01	-4.953
Hour11	-1.646e+02	1.306e+02	-1.261
Hour12	-1.423e+02	1.245e+02	-1.143
Hour13	-4.092e+02	6.201e+01	-6.598
Hour14	-3.307e+01	1.200e+02	-0.276
Hour15	-2.289e+02	4.709e+01	-4.861
Hour16	-2.203e+02	4.111e+01	-5.358
Hour17	-4.520e+02	1.291e+02	-3.501
Hour18	-2.288e+02	3.848e+01	-5.946
Hour19	-2.271e+02	1.235e+02	-1.839
Hour20	-3.920e+00	1.203e+02	-0.033
Hour21	-2.041e+02	1.242e+02	-1.643
Hour22	-7.760e+01	1.186e+02	-0.654
Hour23	-2.407e+02	4.432e+01	-5.430
IsAutumn	8.609e+01	4.174e+01	2.063
RentedBikeCount_Lag1	7.764e-01	3.177e-02	24.440
RentedBikeCount_Lag6	-1.536e-02	2.585e-02	-0.594
RentedBikeCount_Lag8	1.496e-02	2.338e-02	0.640
RentedBikeCount_Lag9	5.582e-02	2.669e-02	2.092
HumidityXVisibility	2.682e-04	1.307e-04	2.053
HumidityXSolarRadiation	2.208e+00	6.699e-01	3.296
HumidityXIsholiday	4.202e-01	5.228e-01	0.804
HumidityXRentedBikeCount_Lag1	7.188e-04	3.139e-04	2.290
HumidityXRentedBikeCount_Lag6	5.125e-04	2.749e-04	1.864
HumidityXRentedBikeCount_Lag9	-9.721e-04	2.600e-04	-3.739
TemperatureXDewPointTemp	-8.965e-02	3.362e-02	-2.666
TemperatureXSolarRadiation	2.027e+00	1.618e+00	1.253
TemperatureXRentedBikeCount_Lag1	2.619e-03	9.608e-04	2.726
TemperatureXRentedBikeCount_Lag2	1.372e-03	1.305e-03	1.051
TemperatureXRentedBikeCount_Lag3	1.526e-03	1.586e-03	0.962
WindSpeedXDewPointTemp	-9.350e-02	3.195e-01	-0.293
WindSpeedXSolarRadiation	-3.008e+00	5.206e+00	-0.578
WindSpeedXRainfall	1.258e+00	3.716e+00	0.339
WindSpeedXSnowfall	4.857e+00	1.073e+01	0.453
WindSpeedXIsholiday	-1.679e+01	1.384e+01	-1.213
WindSpeedXRentedBikeCount_Lag1	1.130e-03	6.582e-03	0.172
VisibilityXDewPointTemp	-2.803e-01	3.171e-01	-0.884
VisibilityXRainfall	9.791e-01	2.024e+00	0.484
VisibilityXSnowfall	-4.640e+00	4.624e+00	-1.003

VisibilityXRentedBikeCount_Lag7	-9.229e-03	4.798e-03	-1.924
DewPointTempXSolarRadiation	-4.284e+00	1.751e+00	-2.447
DewPointTempXRainfall	4.219e-01	4.061e-01	1.039
DewPointTempXSnowfall	-4.172e-01	6.245e-01	-0.668
DewPointTempXIsHoliday	-2.477e-01	1.045e+00	-0.237
DewPointTempXRentedBikeCount_Lag3	-3.992e-04	1.126e-03	-0.355
SolarRadiationXRainfall	6.448e+01	2.136e+01	3.019
SolarRadiationXIsHoliday	2.976e+01	1.366e+01	2.178
SolarRadiationXRentedBikeCount_Lag1	1.831e-02	1.378e-02	1.329
SolarRadiationXRentedBikeCount_Lag2	8.049e-03	1.242e-02	0.648
SolarRadiationXRentedBikeCount_Lag4	1.140e-02	9.733e-03	1.171
SolarRadiationXRentedBikeCount_Lag5	-1.433e-02	7.944e-03	-1.804
SolarRadiationXRentedBikeCount_Lag9	3.888e-02	9.613e-03	4.044
RainfallXSnowfall	6.704e-01	2.848e+00	0.235
RainfallXIsHoliday	1.226e+01	1.297e+01	0.945
RainfallXRentedBikeCount_Lag1	-8.848e-02	1.439e-02	-6.149
RainfallXRentedBikeCount_Lag2	6.235e-04	1.170e-02	0.053
RainfallXRentedBikeCount_Lag4	2.097e-02	9.339e-03	2.246
RainfallXRentedBikeCount_Lag8	-5.978e-03	5.402e-03	-1.107
SnowfallXIsHoliday	-2.396e+00	2.800e+01	-0.086
SnowfallXRentedBikeCount_Lag2	1.365e-02	2.788e-02	0.490
SnowfallXRentedBikeCount_Lag9	-1.038e-02	2.459e-02	-0.422
IsHolidayXRentedBikeCount_Lag4	-9.445e-03	1.344e-02	-0.703
RentedBikeCount_Lag1XRentedBikeCount_Lag2	-9.069e-05	1.078e-05	-8.412
RentedBikeCount_Lag1XRentedBikeCount_Lag7	3.370e-05	1.783e-05	1.890
RentedBikeCount_Lag1XRentedBikeCount_Lag8	-6.871e-05	2.390e-05	-2.875
RentedBikeCount_Lag1XRentedBikeCount_Lag9	1.985e-05	1.786e-05	1.111
RentedBikeCount_Lag2XRentedBikeCount_Lag3	5.698e-05	1.564e-05	3.643
RentedBikeCount_Lag3XRentedBikeCount_Lag4	1.109e-06	1.734e-05	0.064
RentedBikeCount_Lag3XRentedBikeCount_Lag5	-3.866e-05	1.990e-05	-1.943
RentedBikeCount_Lag4XRentedBikeCount_Lag5	1.264e-05	1.696e-05	0.745
RentedBikeCount_Lag4XRentedBikeCount_Lag9	1.052e-05	1.803e-05	0.584
RentedBikeCount_Lag5XRentedBikeCount_Lag6	2.973e-05	1.108e-05	2.682
RentedBikeCount_Lag5XRentedBikeCount_Lag9	-3.851e-07	1.652e-05	-0.023
RentedBikeCount_Lag7XRentedBikeCount_Lag8	-1.795e-05	7.306e-06	-2.457
HumidityXHour1	2.413e+00	6.537e-01	3.692
HumidityXHour2	1.831e+00	6.678e-01	2.743
HumidityXHour3	3.917e+00	8.456e-01	4.632
HumidityXHour4	1.910e+00	6.567e-01	2.908
HumidityXHour5	2.188e+00	5.843e-01	3.745
HumidityXHour6	2.688e+00	6.015e-01	4.469
HumidityXHour7	3.514e+00	6.853e-01	5.127
HumidityXHour8	9.061e-01	7.332e-01	1.236

HumidityXHour9	9.268e-01	7.885e-01	1.175
HumidityXHour10	1.687e+00	6.180e-01	2.730
HumidityXHour11	3.324e-01	7.075e-01	0.470
HumidityXHour12	4.342e-01	7.069e-01	0.614
HumidityXHour13	2.750e+00	8.653e-01	3.178
HumidityXHour14	-5.160e-01	6.606e-01	-0.781
HumidityXHour15	-2.259e-01	6.046e-01	-0.374
HumidityXHour16	1.759e-01	5.823e-01	0.302
HumidityXHour17	1.934e+00	6.977e-01	2.772
HumidityXHour18	1.031e+00	5.909e-01	1.744
HumidityXHour19	5.621e-01	6.615e-01	0.850
HumidityXHour20	8.647e-01	6.452e-01	1.340
HumidityXHour21	1.840e+00	6.646e-01	2.768
HumidityXHour22	1.268e+00	6.585e-01	1.926
HumidityXHour23	9.214e-01	5.651e-01	1.631
TemperatureXHour1	-1.058e+01	1.355e+00	-7.809
TemperatureXHour2	-1.066e+01	1.369e+00	-7.782
TemperatureXHour4	-8.215e+00	1.324e+00	-6.205
TemperatureXHour5	-6.776e+00	1.339e+00	-5.059
TemperatureXHour6	-6.869e+00	1.510e+00	-4.549
TemperatureXHour7	-1.576e+01	1.473e+00	-10.699
TemperatureXHour8	-1.225e+01	1.520e+00	-8.061
TemperatureXHour9	-9.890e+00	1.546e+00	-6.399
TemperatureXHour10	-9.317e+00	1.517e+00	-6.144
TemperatureXHour11	-5.613e+00	1.494e+00	-3.758
TemperatureXHour12	-6.160e+00	1.310e+00	-4.704
TemperatureXHour14	-7.551e+00	1.264e+00	-5.974
TemperatureXHour15	-6.212e+00	1.395e+00	-4.453
TemperatureXHour17	-5.003e+00	1.453e+00	-3.442
TemperatureXHour18	-1.120e+00	1.334e+00	-0.840
TemperatureXHour19	-1.000e+01	1.301e+00	-7.684
TemperatureXHour20	-7.836e+00	1.518e+00	-5.162
TemperatureXHour21	-8.039e+00	1.506e+00	-5.338
TemperatureXHour22	-9.040e+00	1.289e+00	-7.015
TemperatureXHour23	-6.728e+00	1.460e+00	-4.609
WindSpeedXHour1	-1.465e+01	1.891e+01	-0.775
WindSpeedXHour2	3.066e+00	1.957e+01	0.157
WindSpeedXHour3	-6.578e+00	2.003e+01	-0.328
WindSpeedXHour4	9.375e+00	2.015e+01	0.465
WindSpeedXHour5	2.358e+00	2.087e+01	0.113
WindSpeedXHour6	1.018e+01	2.033e+01	0.501
WindSpeedXHour7	-6.951e+00	2.138e+01	-0.325
WindSpeedXHour9	-1.672e+00	1.989e+01	-0.084

WindSpeedXHour10	4.642e+00	1.823e+01	0.255
WindSpeedXHour11	1.345e+01	1.751e+01	0.768
WindSpeedXHour12	1.881e+01	1.628e+01	1.155
WindSpeedXHour13	1.044e+01	1.569e+01	0.665
WindSpeedXHour14	6.967e+00	1.475e+01	0.472
WindSpeedXHour15	1.493e+01	1.364e+01	1.095
WindSpeedXHour19	5.178e+00	1.542e+01	0.336
WindSpeedXHour20	1.273e+01	1.637e+01	0.778
WindSpeedXHour21	-2.295e+01	1.740e+01	-1.319
WindSpeedXHour22	5.101e+00	1.737e+01	0.294
VisibilityXHour1	-6.170e+00	1.220e+01	-0.506
VisibilityXHour2	-2.166e+01	1.217e+01	-1.779
VisibilityXHour3	-9.561e+00	1.212e+01	-0.789
VisibilityXHour4	-1.047e+01	1.092e+01	-0.958
VisibilityXHour7	-1.046e+01	1.106e+01	-0.945
VisibilityXHour8	-2.200e+01	1.203e+01	-1.828
VisibilityXHour9	-2.251e+01	1.309e+01	-1.720
VisibilityXHour11	-2.356e+00	1.460e+01	-0.161
VisibilityXHour12	-1.215e+01	1.450e+01	-0.838
VisibilityXHour14	-2.065e+01	1.403e+01	-1.472
VisibilityXHour17	1.534e+01	1.432e+01	1.072
VisibilityXHour19	-1.174e+01	1.407e+01	-0.834
VisibilityXHour20	-3.895e+01	1.319e+01	-2.952
VisibilityXHour21	-7.566e+00	1.368e+01	-0.553
VisibilityXHour22	-2.297e+01	1.323e+01	-1.736
DewPointTempXHour3	-8.505e+00	1.500e+00	-5.672
DewPointTempXHour13	-6.218e+00	1.610e+00	-3.863
SolarRadiationXHour6	-2.957e+02	5.218e+02	-0.567
SolarRadiationXHour7	-1.620e+02	6.920e+01	-2.341
SolarRadiationXHour8	-1.901e+02	2.971e+01	-6.400
SolarRadiationXHour9	8.176e+00	2.140e+01	0.382
SolarRadiationXHour16	-4.099e+01	1.366e+01	-3.002
SolarRadiationXHour17	2.337e+01	2.114e+01	1.106
SolarRadiationXHour18	-6.749e+00	2.853e+01	-0.237
SolarRadiationXHour19	6.324e+02	5.749e+01	11.000
RainfallXHour1	2.843e+01	1.343e+01	2.117
RainfallXHour2	2.989e+01	1.172e+01	2.549
RainfallXHour3	1.982e+01	1.147e+01	1.729
RainfallXHour4	1.848e+01	7.292e+00	2.534
RainfallXHour5	1.401e+01	1.296e+01	1.081
RainfallXHour7	3.839e+01	7.958e+00	4.824
RainfallXHour8	1.561e+01	7.171e+00	2.176
RainfallXHour9	1.208e+01	7.118e+00	1.698

RainfallXHour10	1.803e+01	9.307e+00	1.938
RainfallXHour11	2.104e+01	8.193e+00	2.568
RainfallXHour12	1.599e+01	1.053e+01	1.519
RainfallXHour13	1.756e+01	6.871e+00	2.555
RainfallXHour14	3.016e+01	1.541e+01	1.958
RainfallXHour15	3.262e+01	9.549e+00	3.416
RainfallXHour16	-5.084e+00	1.672e+01	-0.304
RainfallXHour18	6.398e+00	6.804e+00	0.940
RainfallXHour19	1.615e+01	1.190e+01	1.357
RainfallXHour20	1.774e+01	7.026e+00	2.525
RainfallXHour21	2.204e+01	6.073e+00	3.629
RainfallXHour22	3.589e+00	1.399e+01	0.257
RainfallXHour23	3.231e+01	1.487e+01	2.173
SnowfallXHour1	4.263e+00	1.630e+01	0.262
SnowfallXHour3	3.490e+00	1.687e+01	0.207
SnowfallXHour4	2.955e+00	1.639e+01	0.180
SnowfallXHour6	-2.375e+00	1.601e+01	-0.148
SnowfallXHour9	-9.546e+00	1.482e+01	-0.644
SnowfallXHour11	1.328e+01	1.106e+01	1.201
SnowfallXHour12	1.202e+01	1.302e+01	0.923
SnowfallXHour13	-3.401e+00	1.416e+01	-0.240
SnowfallXHour14	5.034e+00	1.595e+01	0.315
SnowfallXHour16	3.395e+01	2.086e+01	1.627
SnowfallXHour17	8.382e-01	2.089e+01	0.040
SnowfallXHour18	3.166e+01	2.033e+01	1.557
SnowfallXHour20	4.351e+00	1.903e+01	0.229
SnowfallXHour21	3.417e+00	1.846e+01	0.185
SnowfallXHour22	2.076e+00	1.833e+01	0.113
IsHolidayXHour1	4.373e+01	3.386e+01	1.292
IsHolidayXHour2	5.648e+01	3.392e+01	1.665
IsHolidayXHour3	2.759e+01	3.408e+01	0.810
IsHolidayXHour4	4.946e+00	3.383e+01	0.146
IsHolidayXHour5	-1.630e+01	3.376e+01	-0.483
IsHolidayXHour6	6.390e+00	3.437e+01	0.186
IsHolidayXHour7	-2.084e+01	3.426e+01	-0.608
IsHolidayXHour8	-2.946e+01	3.408e+01	-0.864
IsHolidayXHour10	7.395e+00	3.620e+01	0.204
IsHolidayXHour11	-1.968e+01	3.757e+01	-0.524
IsHolidayXHour12	-2.164e+01	3.915e+01	-0.553
IsHolidayXHour13	-2.917e+01	3.899e+01	-0.748
IsHolidayXHour14	-4.560e+01	3.820e+01	-1.194
IsHolidayXHour15	-6.578e+01	3.690e+01	-1.783
IsHolidayXHour16	-1.312e+01	3.561e+01	-0.369

IsHolidayXHour17	-1.563e+01	3.469e+01	-0.451
IsHolidayXHour18	-6.598e+01	3.425e+01	-1.926
IsHolidayXHour19	1.028e+02	3.424e+01	3.002
IsHolidayXHour20	5.813e+01	3.440e+01	1.690
IsHolidayXHour21	2.639e+01	3.463e+01	0.762
IsHolidayXHour22	2.622e+01	3.440e+01	0.762
IsHolidayXHour23	1.097e+01	3.420e+01	0.321
RentedBikeCount_Lag1XHour3	-2.809e-01	9.838e-02	-2.856
RentedBikeCount_Lag1XHour6	2.221e+00	1.365e-01	16.272
RentedBikeCount_Lag1XHour7	1.628e+00	4.551e-02	35.769
RentedBikeCount_Lag1XHour8	8.842e-01	2.284e-02	38.706
RentedBikeCount_Lag1XHour9	-2.465e-01	1.872e-02	-13.166
RentedBikeCount_Lag1XHour10	2.503e-01	4.278e-02	5.851
RentedBikeCount_Lag1XHour12	2.648e-01	8.660e-02	3.058
RentedBikeCount_Lag1XHour13	2.666e-01	5.745e-02	4.640
RentedBikeCount_Lag1XHour14	5.203e-01	5.563e-02	9.354
RentedBikeCount_Lag1XHour15	4.701e-01	2.514e-02	18.696
RentedBikeCount_Lag1XHour16	2.928e-01	5.899e-02	4.963
RentedBikeCount_Lag1XHour17	3.525e-01	5.878e-02	5.997
RentedBikeCount_Lag1XHour18	5.661e-01	2.452e-02	23.086
RentedBikeCount_Lag1XHour20	3.215e-01	3.099e-02	10.372
RentedBikeCount_Lag1XHour21	2.033e-01	3.176e-02	6.400
RentedBikeCount_Lag1XHour23	1.369e-01	3.585e-02	3.819
RentedBikeCount_Lag2XHour1	2.353e-01	6.253e-02	3.763
RentedBikeCount_Lag2XHour2	1.420e-01	4.141e-02	3.428
RentedBikeCount_Lag2XHour3	2.745e-01	9.661e-02	2.842
RentedBikeCount_Lag2XHour4	-2.518e-02	9.544e-02	-0.264
RentedBikeCount_Lag2XHour6	-8.364e-01	1.386e-01	-6.036
RentedBikeCount_Lag2XHour11	4.662e-01	4.885e-02	9.542
RentedBikeCount_Lag2XHour12	2.936e-01	1.186e-01	2.477
RentedBikeCount_Lag2XHour16	3.126e-01	1.231e-01	2.540
RentedBikeCount_Lag2XHour17	1.731e-01	8.707e-02	1.988
RentedBikeCount_Lag2Xhour22	7.172e-02	5.263e-02	1.363
RentedBikeCount_Lag3XHour1	-5.793e-02	5.614e-02	-1.032
RentedBikeCount_Lag3XHour2	4.609e-02	7.205e-02	0.640
RentedBikeCount_Lag3XHour3	8.663e-02	7.277e-02	1.190
RentedBikeCount_Lag3XHour4	9.984e-02	7.691e-02	1.298
RentedBikeCount_Lag3XHour12	4.235e-02	7.164e-02	0.591
RentedBikeCount_Lag3XHour13	2.576e-01	8.258e-02	3.120
RentedBikeCount_Lag3XHour14	-5.849e-02	1.002e-01	-0.584
RentedBikeCount_Lag3XHour16	-1.810e-01	1.381e-01	-1.310
RentedBikeCount_Lag3XHour17	-1.430e-01	1.192e-01	-1.200
RentedBikeCount_Lag3XHour19	1.205e-01	6.431e-02	1.874

RentedBikeCount_Lag3XHour20	2.838e-01	6.040e-02	4.698
RentedBikeCount_Lag3XHour21	1.787e-01	3.099e-02	5.768
RentedBikeCount_Lag3XHour22	2.114e-01	6.730e-02	3.141
RentedBikeCount_Lag4XHour2	-1.838e-02	9.773e-02	-0.188
RentedBikeCount_Lag4XHour3	-2.414e-02	6.862e-02	-0.352
RentedBikeCount_Lag4XHour11	-9.060e-02	4.561e-02	-1.986
RentedBikeCount_Lag4XHour14	-4.589e-02	8.927e-02	-0.514
RentedBikeCount_Lag4XHour16	-8.500e-03	9.435e-02	-0.090
RentedBikeCount_Lag4XHour17	1.096e-01	9.656e-02	1.135
RentedBikeCount_Lag4XHour19	3.598e-01	8.890e-02	4.047
RentedBikeCount_Lag4XHour20	-2.631e-01	8.803e-02	-2.988
RentedBikeCount_Lag4XHour21	-3.757e-02	4.647e-02	-0.809
RentedBikeCount_Lag4XHour22	3.264e-02	3.632e-02	0.899
RentedBikeCount_Lag5XHour2	1.414e-01	9.967e-02	1.418
RentedBikeCount_Lag5XHour3	5.821e-02	5.054e-02	1.152
RentedBikeCount_Lag5XHour5	1.177e-01	3.319e-02	3.545
RentedBikeCount_Lag5XHour9	9.372e-01	2.796e-01	3.352
RentedBikeCount_Lag5XHour10	-1.603e-01	2.145e-01	-0.747
RentedBikeCount_Lag5XHour19	-4.102e-01	1.237e-01	-3.315
RentedBikeCount_Lag5XHour20	1.268e-01	8.473e-02	1.496
RentedBikeCount_Lag6XHour2	-5.746e-02	5.856e-02	-0.981
RentedBikeCount_Lag6XHour4	-1.412e-02	4.751e-02	-0.297
RentedBikeCount_Lag6XHour9	3.252e-01	1.708e-01	1.905
RentedBikeCount_Lag6XHour10	5.339e-01	2.601e-01	2.053
RentedBikeCount_Lag6XHour16	7.445e-02	1.116e-01	0.667
RentedBikeCount_Lag6XHour18	-7.257e-01	3.674e-02	-19.755
RentedBikeCount_Lag6XHour19	5.920e-01	1.318e-01	4.491
RentedBikeCount_Lag6XHour20	1.740e-02	5.566e-02	0.313
RentedBikeCount_Lag6XHour22	2.673e-02	6.559e-02	0.408
RentedBikeCount_Lag6XHour23	1.874e-01	5.277e-02	3.552
RentedBikeCount_Lag7XHour1	8.443e-02	1.906e-02	4.430
RentedBikeCount_Lag7XHour8	9.596e-02	3.916e-02	2.451
RentedBikeCount_Lag7XHour16	-3.100e-03	1.083e-01	-0.029
RentedBikeCount_Lag7XHour19	-3.143e-01	9.176e-02	-3.425
RentedBikeCount_Lag7XHour21	1.020e-01	8.668e-02	1.177
RentedBikeCount_Lag7XHour22	-7.381e-02	8.788e-02	-0.840
RentedBikeCount_Lag7XHour23	-2.064e-01	8.407e-02	-2.455
RentedBikeCount_Lag8XHour4	4.093e-02	3.692e-02	1.108
RentedBikeCount_Lag8XHour5	-1.305e-02	5.871e-02	-0.222
RentedBikeCount_Lag8XHour6	-6.236e-02	7.309e-02	-0.853
RentedBikeCount_Lag8XHour10	9.384e-03	1.109e-01	0.085
RentedBikeCount_Lag8XHour16	4.276e-02	3.609e-02	1.185
RentedBikeCount_Lag8XHour17	-3.456e-02	8.011e-02	-0.431

RentedBikeCount_Lag8XHour21	2.261e-02	7.851e-02	0.288
RentedBikeCount_Lag8XHour22	9.770e-02	1.220e-01	0.800
RentedBikeCount_Lag8XHour23	1.370e-01	6.308e-02	2.172
RentedBikeCount_Lag9XHour5	3.172e-02	5.426e-02	0.585
RentedBikeCount_Lag9XHour6	5.720e-02	6.346e-02	0.901
RentedBikeCount_Lag9XHour7	3.351e-03	1.817e-02	0.184
RentedBikeCount_Lag9XHour8	-4.463e-02	2.842e-02	-1.570
RentedBikeCount_Lag9XHour10	-2.607e-02	7.621e-02	-0.342
RentedBikeCount_Lag9XHour13	3.305e-02	1.378e-01	0.240
RentedBikeCount_Lag9XHour17	1.277e-01	3.504e-02	3.644
RentedBikeCount_Lag9XHour18	1.045e+00	3.642e-02	28.688
RentedBikeCount_Lag9XHour19	3.783e-02	7.645e-02	0.495
RentedBikeCount_Lag9XHour22	-3.593e-04	8.791e-02	-0.004
TemperatureXIIsWinter	-1.299e+00	1.713e+00	-0.758
TemperatureXIIsSummer	-2.936e+00	1.528e+00	-1.921
TemperatureXIIsAutumn	-2.494e+00	6.712e-01	-3.715
WindSpeedXIIsSummer	2.260e+01	9.869e+00	2.290
VisibilityXIIsAutumn	6.547e-01	5.750e+00	0.114
DewPointTempXIIsWinter	-1.912e-01	1.116e+00	-0.171
DewPointTempXIIsSummer	-1.965e+00	1.155e+00	-1.701
SolarRadiationXIIsWinter	-2.929e+01	1.156e+01	-2.535
SolarRadiationXIIsSummer	-1.716e+01	9.566e+00	-1.793
Rainfall1XIIsWinter	-2.019e+00	1.018e+01	-0.198
Rainfall1XIIsSummer	-7.667e+00	4.336e+00	-1.768
Rainfall1XIIsAutumn	-1.310e+00	4.828e+00	-0.271
IsHolidayXIIsSummer	1.407e+01	2.726e+01	0.516
IsHolidayXIIsAutumn	1.279e+00	1.795e+01	0.071
Hour1XIIsWinter	3.052e+01	2.728e+01	1.119
Hour1XIIsAutumn	-5.050e+01	1.873e+01	-2.696
Hour2XIIsWinter	-1.769e+01	2.710e+01	-0.653
Hour2XIIsAutumn	-7.404e+01	2.100e+01	-3.526
Hour3XIIsWinter	1.693e+01	2.856e+01	0.593
Hour3XIIsSummer	-3.838e+01	2.645e+01	-1.451
Hour3XIIsAutumn	-7.198e+01	2.159e+01	-3.334
Hour4XIIsWinter	8.172e+00	2.698e+01	0.303
Hour4XIIsAutumn	-5.209e+01	1.953e+01	-2.668
Hour5XIIsWinter	1.433e+01	2.668e+01	0.537
Hour5XIIsAutumn	-8.104e+01	1.977e+01	-4.099
Hour6XIIsWinter	-1.570e+01	2.796e+01	-0.562
Hour6XIIsSummer	-5.694e+01	2.739e+01	-2.079
Hour6XIIsAutumn	-6.133e+01	2.158e+01	-2.843
Hour7XIIsWinter	-1.178e+02	2.808e+01	-4.197
Hour7XIIsSummer	-1.428e+02	2.757e+01	-5.179

Hour7XIIsAutumn	-1.370e+02	2.255e+01	-6.075
Hour8XIIsWinter	-8.344e+01	2.818e+01	-2.961
Hour8XIIsSummer	2.417e+01	2.809e+01	0.861
Hour8XIIsAutumn	-7.329e+01	2.227e+01	-3.291
Hour9XIIsWinter	-7.402e+01	2.849e+01	-2.598
Hour9XIIsSummer	-7.269e+01	2.968e+01	-2.449
Hour9XIIsAutumn	-9.435e+01	2.180e+01	-4.327
Hour10XIIsWinter	-2.915e+01	2.821e+01	-1.033
Hour10XIIsSummer	-5.723e+01	3.152e+01	-1.816
Hour10XIIsAutumn	-6.552e+01	2.057e+01	-3.185
Hour11XIIsWinter	4.617e+00	2.869e+01	0.161
Hour11XIIsSummer	-6.573e+01	3.227e+01	-2.037
Hour11XIIsAutumn	-8.871e+01	2.032e+01	-4.366
Hour12XIIsSummer	-7.715e+01	3.281e+01	-2.351
Hour12XIIsAutumn	-9.018e+01	1.970e+01	-4.578
Hour13XIIsWinter	3.496e+01	2.841e+01	1.231
Hour13XIIsSummer	-4.062e+01	3.432e+01	-1.184
Hour13XIIsAutumn	-1.630e+01	2.011e+01	-0.811
Hour14XIIsSummer	2.212e+01	2.893e+01	0.764
Hour15XIIsWinter	2.682e+01	2.713e+01	0.989
Hour15XIIsSummer	7.810e+01	2.785e+01	2.804
Hour16XIIsSummer	-7.174e+01	2.689e+01	-2.668
Hour16XIIsAutumn	-9.989e+01	2.023e+01	-4.937
Hour17XIIsWinter	4.868e+01	2.848e+01	1.709
Hour17XIIsSummer	1.548e+01	3.001e+01	0.516
Hour17XIIsAutumn	-6.784e+00	2.222e+01	-0.305
Hour18XIIsSummer	-1.860e+02	2.677e+01	-6.950
Hour18XIIsAutumn	-1.383e+02	2.140e+01	-6.461
Hour19XIIsSummer	1.475e+02	2.803e+01	5.261
Hour19XIIsAutumn	6.217e+01	2.174e+01	2.860
Hour20XIIsWinter	1.750e+01	2.704e+01	0.647
Hour20XIIsSummer	1.034e+02	2.625e+01	3.938
Hour21XIIsWinter	6.307e-01	2.849e+01	0.022
Hour21XIIsSummer	2.329e+01	2.837e+01	0.821
Hour21XIIsAutumn	-7.581e+01	1.928e+01	-3.933
Hour22XIIsSummer	5.622e+01	2.853e+01	1.971
Hour22XIIsAutumn	-1.624e+01	1.861e+01	-0.873
Hour23XIIsWinter	2.947e+01	2.720e+01	1.083
Hour23XIIsSummer	1.386e+01	2.934e+01	0.472
Hour23XIIsAutumn	-2.610e+01	1.871e+01	-1.396
RentedBikeCount_Lag1XIIsAutumn	2.161e-02	7.939e-03	2.723
RentedBikeCount_Lag3XIIsWinter	6.873e-03	2.931e-02	0.235
RentedBikeCount_Lag5XIIsSummer	1.314e-02	1.524e-02	0.862

RentedBikeCount_Lag6XIsSummer	-8.995e-03	1.536e-02	-0.586
RentedBikeCount_Lag6XIsAutumn	-5.114e-02	1.017e-02	-5.030
RentedBikeCount_Lag8XIsAutumn	4.297e-02	9.528e-03	4.510
RentedBikeCount_Lag9XIsWinter	-3.201e-02	2.687e-02	-1.191
Temperature	4.720e+00	3.254e+00	1.451
WindSpeed	-7.595e+00	8.989e+00	-0.845
DewPointTemp	7.229e+00	4.110e+00	1.759
Snowfall	1.804e+01	2.750e+01	0.656
IsHoliday	-3.454e+01	4.351e+01	-0.794
IsWinter	2.659e+01	1.818e+01	1.462
IsSummer	1.101e+02	3.091e+01	3.563
RentedBikeCount_Lag2	-2.392e-01	3.062e-02	-7.813
RentedBikeCount_Lag3	-6.991e-02	3.398e-02	-2.058
RentedBikeCount_Lag4	-8.695e-03	3.137e-02	-0.277
RentedBikeCount_Lag5	-9.410e-02	2.535e-02	-3.711
RentedBikeCount_Lag7	7.322e-02	3.963e-02	1.847
Humidity2	2.087e+01	6.509e+01	0.321
Humidity3	1.598e+01	5.858e+01	0.273
Humidity4	-5.389e+00	5.683e+01	-0.095
Humidity5	-9.759e+00	5.688e+01	-0.172
Humidity6	-1.896e+01	5.828e+01	-0.325
Humidity7	-2.998e+01	6.059e+01	-0.495
Humidity8	-3.442e+01	6.390e+01	-0.539
Humidity9	-2.830e+01	6.764e+01	-0.418
Humidity10	-2.795e+01	7.198e+01	-0.388
ExtremeWind	-9.540e+00	6.967e+00	-1.369
Pr(> t )			
(Intercept)	0.006178	**	
Humidity	0.049695	*	
Visibility	0.183781		
SolarRadiation	0.028846	*	
Rainfall	0.031445	*	
Hour1	0.014182	*	
Hour2	0.279089		
Hour3	0.001150	**	
Hour4	0.039068	*	
Hour5	2.62e-09	***	
Hour6	6.28e-10	***	
Hour7	0.039379	*	
Hour8	0.528752		
Hour9	0.970308		
Hour10	7.46e-07	***	
Hour11	0.207401		

Hour12	0.252971
Hour13	4.42e-11 ***
Hour14	0.782764
Hour15	1.19e-06 ***
Hour16	8.62e-08 ***
Hour17	0.000466 ***
Hour18	2.86e-09 ***
Hour19	0.065940 .
Hour20	0.974012
Hour21	0.100341
Hour22	0.513055
Hour23	5.80e-08 ***
IsAutumn	0.039181 *
RentedBikeCount_Lag1	< 2e-16 ***
RentedBikeCount_Lag6	0.552318
RentedBikeCount_Lag8	0.522112
RentedBikeCount_Lag9	0.036472 *
HumidityXVisibility	0.040098 *
HumidityXSolarRadiation	0.000984 ***
HumidityXIsHoliday	0.421556
HumidityXRentedBikeCount_Lag1	0.022036 *
HumidityXRentedBikeCount_Lag6	0.062327 .
HumidityXRentedBikeCount_Lag9	0.000186 ***
TemperatureXDewPointTemp	0.007680 **
TemperatureXSolarRadiation	0.210305
TemperatureXRentedBikeCount_Lag1	0.006422 **
TemperatureXRentedBikeCount_Lag2	0.293327
TemperatureXRentedBikeCount_Lag3	0.336041
WindSpeedXDewPointTemp	0.769772
WindSpeedXSolarRadiation	0.563372
WindSpeedXRainfall	0.734918
WindSpeedXSnowfall	0.650667
WindSpeedXIsHoliday	0.225254
WindSpeedXRentedBikeCount_Lag1	0.863700
VisibilityXDewPointTemp	0.376724
VisibilityXRainfall	0.628632
VisibilityXSnowfall	0.315683
VisibilityXRentedBikeCount_Lag7	0.054440 .
DewPointTempXSolarRadiation	0.014425 *
DewPointTempXRainfall	0.298843
DewPointTempXSnowfall	0.504143
DewPointTempXIsHoliday	0.812690
DewPointTempXRentedBikeCount_Lag3	0.722861

SolarRadiationXRainfall	0.002543 **
SolarRadiationXIsHoliday	0.029412 *
SolarRadiationXRentedBikeCount_Lag1	0.184028
SolarRadiationXRentedBikeCount_Lag2	0.516824
SolarRadiationXRentedBikeCount_Lag4	0.241542
SolarRadiationXRentedBikeCount_Lag5	0.071285 .
SolarRadiationXRentedBikeCount_Lag9	5.29e-05 ***
RainfallXSnowfall	0.813918
RainfallXIIsHoliday	0.344602
RainfallXRentedBikeCount_Lag1	8.14e-10 ***
RainfallXRentedBikeCount_Lag2	0.957506
RainfallXRentedBikeCount_Lag4	0.024739 *
RainfallXRentedBikeCount_Lag8	0.268501
SnowfallXIIsHoliday	0.931813
SnowfallXRentedBikeCount_Lag2	0.624467
SnowfallXRentedBikeCount_Lag9	0.673001
IsHolidayXRentedBikeCount_Lag4	0.482062
RentedBikeCount_Lag1XRentedBikeCount_Lag2	< 2e-16 ***
RentedBikeCount_Lag1XRentedBikeCount_Lag7	0.058773 .
RentedBikeCount_Lag1XRentedBikeCount_Lag8	0.004052 **
RentedBikeCount_Lag1XRentedBikeCount_Lag9	0.266475
RentedBikeCount_Lag2XRentedBikeCount_Lag3	0.000271 ***
RentedBikeCount_Lag3XRentedBikeCount_Lag4	0.948995
RentedBikeCount_Lag3XRentedBikeCount_Lag5	0.052061 .
RentedBikeCount_Lag4XRentedBikeCount_Lag5	0.456012
RentedBikeCount_Lag4XRentedBikeCount_Lag9	0.559568
RentedBikeCount_Lag5XRentedBikeCount_Lag6	0.007330 **
RentedBikeCount_Lag5XRentedBikeCount_Lag9	0.981405
RentedBikeCount_Lag7XRentedBikeCount_Lag8	0.014040 *
HumidityXHour1	0.000224 ***
HumidityXHour2	0.006108 **
HumidityXHour3	3.68e-06 ***
HumidityXHour4	0.003652 **
HumidityXHour5	0.000182 ***
HumidityXHour6	7.96e-06 ***
HumidityXHour7	3.01e-07 ***
HumidityXHour8	0.216607
HumidityXHour9	0.239916
HumidityXHour10	0.006352 **
HumidityXHour11	0.638504
HumidityXHour12	0.539010
HumidityXHour13	0.001489 **
HumidityXHour14	0.434744

HumidityXHour15	0.708743
HumidityXHour16	0.762648
HumidityXHour17	0.005578 **
HumidityXHour18	0.081144 .
HumidityXHour19	0.395494
HumidityXHour20	0.180231
HumidityXHour21	0.005645 **
HumidityXHour22	0.054129 .
HumidityXHour23	0.103013
TemperatureXHour1	6.44e-15 ***
TemperatureXHour2	7.97e-15 ***
TemperatureXHour4	5.74e-10 ***
TemperatureXHour5	4.32e-07 ***
TemperatureXHour6	5.47e-06 ***
TemperatureXHour7	< 2e-16 ***
TemperatureXHour8	8.64e-16 ***
TemperatureXHour9	1.65e-10 ***
TemperatureXHour10	8.44e-10 ***
TemperatureXHour11	0.000173 ***
TemperatureXHour12	2.60e-06 ***
TemperatureXHour14	2.41e-09 ***
TemperatureXHour15	8.60e-06 ***
TemperatureXHour17	0.000579 ***
TemperatureXHour18	0.401030
TemperatureXHour19	1.71e-14 ***
TemperatureXHour20	2.51e-07 ***
TemperatureXHour21	9.62e-08 ***
TemperatureXHour22	2.48e-12 ***
TemperatureXHour23	4.11e-06 ***
WindSpeedXHour1	0.438526
WindSpeedXHour2	0.875489
WindSpeedXHour3	0.742569
WindSpeedXHour4	0.641746
WindSpeedXHour5	0.910044
WindSpeedXHour6	0.616645
WindSpeedXHour7	0.745094
WindSpeedXHour9	0.933004
WindSpeedXHour10	0.798992
WindSpeedXHour11	0.442490
WindSpeedXHour12	0.248036
WindSpeedXHour13	0.505803
WindSpeedXHour14	0.636734
WindSpeedXHour15	0.273709

WindSpeedXHour19	0.737040
WindSpeedXHour20	0.436779
WindSpeedXHour21	0.187306
WindSpeedXHour22	0.769057
VisibilityXHour1	0.613047
VisibilityXHour2	0.075291 .
VisibilityXHour3	0.430325
VisibilityXHour4	0.337854
VisibilityXHour7	0.344476
VisibilityXHour8	0.067523 .
VisibilityXHour9	0.085409 .
VisibilityXHour11	0.871783
VisibilityXHour12	0.402314
VisibilityXHour14	0.141190
VisibilityXHour17	0.283895
VisibilityXHour19	0.404090
VisibilityXHour20	0.003166 **
VisibilityXHour21	0.580144
VisibilityXHour22	0.082640 .
DewPointTempXHour3	1.46e-08 ***
DewPointTempXHour13	0.000113 ***
SolarRadiationXHour6	0.570990
SolarRadiationXHour7	0.019262 *
SolarRadiationXHour8	1.64e-10 ***
SolarRadiationXHour9	0.702420
SolarRadiationXHour16	0.002692 **
SolarRadiationXHour17	0.268932
SolarRadiationXHour18	0.812991
SolarRadiationXHour19	< 2e-16 ***
Rainfall1XHour1	0.034314 *
Rainfall1XHour2	0.010808 *
Rainfall1XHour3	0.083901 .
Rainfall1XHour4	0.011293 *
Rainfall1XHour5	0.279582
Rainfall1XHour7	1.43e-06 ***
Rainfall1XHour8	0.029565 *
Rainfall1XHour9	0.089610 .
Rainfall1XHour10	0.052698 .
Rainfall1XHour11	0.010236 *
Rainfall1XHour12	0.128700
Rainfall1XHour13	0.010632 *
Rainfall1XHour14	0.050305 .
Rainfall1XHour15	0.000639 ***

RainfallXHour16	0.761140
RainfallXHour18	0.347054
RainfallXHour19	0.174936
RainfallXHour20	0.011576 *
RainfallXHour21	0.000286 ***
RainfallXHour22	0.797498
RainfallXHour23	0.029828 *
SnowfallXHour1	0.793631
SnowfallXHour3	0.836135
SnowfallXHour4	0.856970
SnowfallXHour6	0.882057
SnowfallXHour9	0.519574
SnowfallXHour11	0.229954
SnowfallXHour12	0.355927
SnowfallXHour13	0.810234
SnowfallXHour14	0.752395
SnowfallXHour16	0.103721
SnowfallXHour17	0.967997
SnowfallXHour18	0.119500
SnowfallXHour20	0.819179
SnowfallXHour21	0.853167
SnowfallXHour22	0.909835
IsHolidayXHour1	0.196560
IsHolidayXHour2	0.095907 .
IsHolidayXHour3	0.418163
IsHolidayXHour4	0.883757
IsHolidayXHour5	0.629200
IsHolidayXHour6	0.852514
IsHolidayXHour7	0.542980
IsHolidayXHour8	0.387393
IsHolidayXHour10	0.838131
IsHolidayXHour11	0.600499
IsHolidayXHour12	0.580445
IsHolidayXHour13	0.454459
IsHolidayXHour14	0.232601
IsHolidayXHour15	0.074624 .
IsHolidayXHour16	0.712470
IsHolidayXHour17	0.652270
IsHolidayXHour18	0.054078 .
IsHolidayXHour19	0.002691 **
IsHolidayXHour20	0.091086 .
IsHolidayXHour21	0.446081
IsHolidayXHour22	0.445854

IsHolidayXHour23	0.748322
RentedBikeCount_Lag1XHour3	0.004306 **
RentedBikeCount_Lag1XHour6	< 2e-16 ***
RentedBikeCount_Lag1XHour7	< 2e-16 ***
RentedBikeCount_Lag1XHour8	< 2e-16 ***
RentedBikeCount_Lag1XHour9	< 2e-16 ***
RentedBikeCount_Lag1XHour10	5.06e-09 ***
RentedBikeCount_Lag1XHour12	0.002238 **
RentedBikeCount_Lag1XHour13	3.54e-06 ***
RentedBikeCount_Lag1XHour14	< 2e-16 ***
RentedBikeCount_Lag1XHour15	< 2e-16 ***
RentedBikeCount_Lag1XHour16	7.09e-07 ***
RentedBikeCount_Lag1XHour17	2.09e-09 ***
RentedBikeCount_Lag1XHour18	< 2e-16 ***
RentedBikeCount_Lag1XHour20	< 2e-16 ***
RentedBikeCount_Lag1XHour21	1.64e-10 ***
RentedBikeCount_Lag1XHour23	0.000135 ***
RentedBikeCount_Lag2XHour1	0.000169 ***
RentedBikeCount_Lag2XHour2	0.000611 ***
RentedBikeCount_Lag2XHour3	0.004498 **
RentedBikeCount_Lag2XHour4	0.791909
RentedBikeCount_Lag2XHour6	1.65e-09 ***
RentedBikeCount_Lag2XHour11	< 2e-16 ***
RentedBikeCount_Lag2XHour12	0.013279 *
RentedBikeCount_Lag2XHour16	0.011116 *
RentedBikeCount_Lag2XHour17	0.046830 *
RentedBikeCount_Lag2XHour22	0.173030
RentedBikeCount_Lag3XHour1	0.302149
RentedBikeCount_Lag3XHour2	0.522363
RentedBikeCount_Lag3XHour3	0.233892
RentedBikeCount_Lag3XHour4	0.194247
RentedBikeCount_Lag3XHour12	0.554448
RentedBikeCount_Lag3XHour13	0.001815 **
RentedBikeCount_Lag3XHour14	0.559446
RentedBikeCount_Lag3XHour16	0.190244
RentedBikeCount_Lag3XHour17	0.230101
RentedBikeCount_Lag3XHour19	0.060927 .
RentedBikeCount_Lag3XHour20	2.67e-06 ***
RentedBikeCount_Lag3XHour21	8.29e-09 ***
RentedBikeCount_Lag3XHour22	0.001687 **
RentedBikeCount_Lag4XHour2	0.850836
RentedBikeCount_Lag4XHour3	0.724966
RentedBikeCount_Lag4XHour11	0.047029 *

RentedBikeCount_Lag4XHour14	0.607233
RentedBikeCount_Lag4XHour16	0.928218
RentedBikeCount_Lag4XHour17	0.256455
RentedBikeCount_Lag4XHour19	5.24e-05 ***
RentedBikeCount_Lag4XHour20	0.002814 **
RentedBikeCount_Lag4XHour21	0.418811
RentedBikeCount_Lag4XHour22	0.368765
RentedBikeCount_Lag5XHour2	0.156168
RentedBikeCount_Lag5XHour3	0.249417
RentedBikeCount_Lag5XHour5	0.000395 ***
RentedBikeCount_Lag5XHour9	0.000805 ***
RentedBikeCount_Lag5XHour10	0.454880
RentedBikeCount_Lag5XHour19	0.000922 ***
RentedBikeCount_Lag5XHour20	0.134562
RentedBikeCount_Lag6XHour2	0.326595
RentedBikeCount_Lag6XHour4	0.766278
RentedBikeCount_Lag6XHour9	0.056851 .
RentedBikeCount_Lag6XHour10	0.040091 *
RentedBikeCount_Lag6XHour16	0.504563
RentedBikeCount_Lag6XHour18	< 2e-16 ***
RentedBikeCount_Lag6XHour19	7.20e-06 ***
RentedBikeCount_Lag6XHour20	0.754628
RentedBikeCount_Lag6XHour22	0.683615
RentedBikeCount_Lag6XHour23	0.000385 ***
RentedBikeCount_Lag7XHour1	9.57e-06 ***
RentedBikeCount_Lag7Xhour8	0.014277 *
RentedBikeCount_Lag7XHour16	0.977173
RentedBikeCount_Lag7XHour19	0.000618 ***
RentedBikeCount_Lag7XHour21	0.239346
RentedBikeCount_Lag7XHour22	0.400979
RentedBikeCount_Lag7XHour23	0.014102 *
RentedBikeCount_Lag8XHour4	0.267686
RentedBikeCount_Lag8XHour5	0.824122
RentedBikeCount_Lag8XHour6	0.393602
RentedBikeCount_Lag8XHour10	0.932561
RentedBikeCount_Lag8XHour16	0.236084
RentedBikeCount_Lag8XHour17	0.666214
RentedBikeCount_Lag8XHour21	0.773401
RentedBikeCount_Lag8XHour22	0.423457
RentedBikeCount_Lag8XHour23	0.029864 *
RentedBikeCount_Lag9XHour5	0.558760
RentedBikeCount_Lag9XHour6	0.367436
RentedBikeCount_Lag9XHour7	0.853650

RentedBikeCount_Lag9XHour8	0.116387
RentedBikeCount_Lag9XHour10	0.732244
RentedBikeCount_Lag9XHour13	0.810466
RentedBikeCount_Lag9XHour17	0.000271 ***
RentedBikeCount_Lag9XHour18	< 2e-16 ***
RentedBikeCount_Lag9XHour19	0.620700
RentedBikeCount_Lag9XHour22	0.996739
TemperatureXIIsWinter	0.448385
TemperatureXIIsSummer	0.054813 .
TemperatureXIIsAutumn	0.000204 ***
WindSpeedXIIsSummer	0.022022 *
VisibilityXIIsAutumn	0.909349
DewPointTempXIIsWinter	0.863902
DewPointTempXIIsSummer	0.088974 .
SolarRadiationXIIsWinter	0.011271 *
SolarRadiationXIIsSummer	0.072935 .
RainfallXIIsWinter	0.842772
RainfallXIIsSummer	0.077091 .
RainfallXIIsAutumn	0.786184
IsHolidayXIIsSummer	0.605722
IsHolidayXIIsAutumn	0.943204
Hour1XIIsWinter	0.263205
Hour1XIIsAutumn	0.007039 **
Hour2XIIsWinter	0.513883
Hour2XIIsAutumn	0.000424 ***
Hour3XIIsWinter	0.553224
Hour3XIIsSummer	0.146817
Hour3XIIsAutumn	0.000861 ***
Hour4XIIsWinter	0.761992
Hour4XIIsAutumn	0.007651 **
Hour5XIIsWinter	0.591162
Hour5XIIsAutumn	4.20e-05 ***
Hour6XIIsWinter	0.574377
Hour6XIIsSummer	0.037636 *
Hour6XIIsAutumn	0.004487 **
Hour7XIIsWinter	2.74e-05 ***
Hour7XIIsSummer	2.28e-07 ***
Hour7XIIsAutumn	1.30e-09 ***
Hour8XIIsWinter	0.003074 **
Hour8XIIsSummer	0.389475
Hour8XIIsAutumn	0.001003 **
Hour9XIIsWinter	0.009405 **
Hour9XIIsSummer	0.014333 *

Hour9XIIsAutumn	1.53e-05 ***
Hour10XIIsWinter	0.301510
Hour10XIIsSummer	0.069479 .
Hour10XIIsAutumn	0.001451 **
Hour11XIIsWinter	0.872169
Hour11XIIsSummer	0.041709 *
Hour11XIIsAutumn	1.28e-05 ***
Hour12XIIsSummer	0.018742 *
Hour12XIIsAutumn	4.76e-06 ***
Hour13XIIsWinter	0.218542
Hour13XIIsSummer	0.236612
Hour13XIIsAutumn	0.417673
Hour14XIIsSummer	0.444595
Hour15XIIsWinter	0.322899
Hour15XIIsSummer	0.005052 **
Hour16XIIsSummer	0.007653 **
Hour16XIIsAutumn	8.08e-07 ***
Hour17XIIsWinter	0.087402 .
Hour17XIIsSummer	0.605984
Hour17XIIsAutumn	0.760123
Hour18XIIsSummer	3.94e-12 ***
Hour18XIIsAutumn	1.10e-10 ***
Hour19XIIsSummer	1.47e-07 ***
Hour19XIIsAutumn	0.004244 **
Hour20XIIsWinter	0.517552
Hour20XIIsSummer	8.30e-05 ***
Hour21XIIsWinter	0.982338
Hour21XIIsSummer	0.411639
Hour21XIIsAutumn	8.47e-05 ***
Hour22XIIsSummer	0.048772 *
Hour22XIIsAutumn	0.382767
Hour23XIIsWinter	0.278717
Hour23XIIsSummer	0.636785
Hour23XIIsAutumn	0.162893
RentedBikeCount_Lag1XIIsAutumn	0.006488 **
RentedBikeCount_Lag3XIIsWinter	0.814572
RentedBikeCount_Lag5XIIsSummer	0.388488
RentedBikeCount_Lag6XIIsSummer	0.558201
RentedBikeCount_Lag6XIIsAutumn	5.02e-07 ***
RentedBikeCount_Lag8XIIsAutumn	6.56e-06 ***
RentedBikeCount_Lag9XIIsWinter	0.233667
Temperature	0.146915
WindSpeed	0.398207

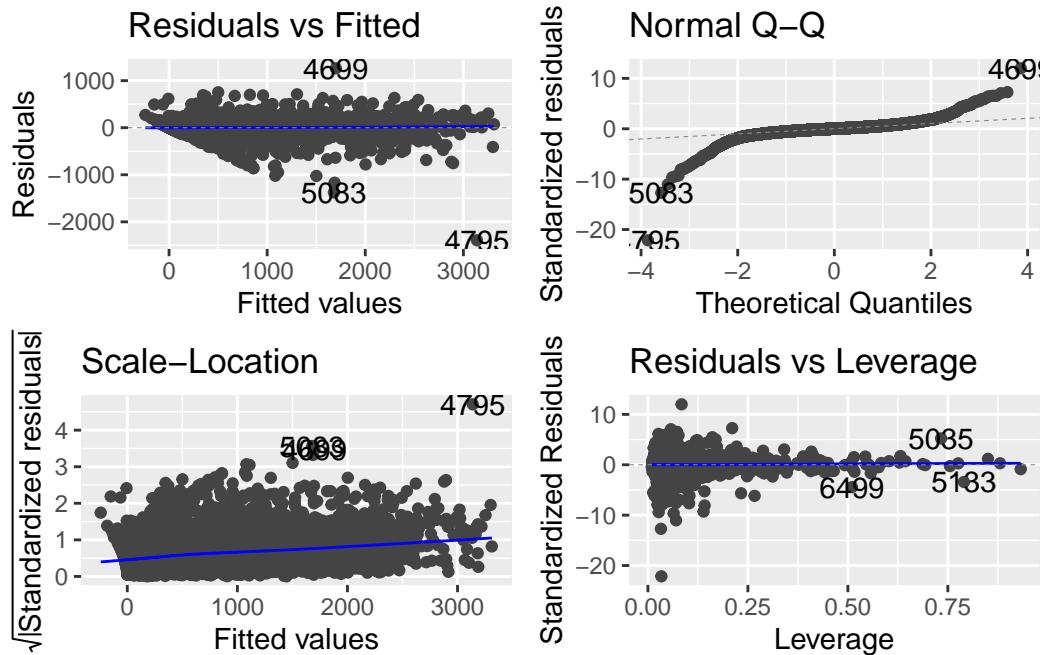
```

DewPointTemp          0.078634 .
Snowfall              0.511970
IsHoliday             0.427320
IsWinter              0.143685
IsSummer               0.000369 ***
RentedBikeCount_Lag2  6.29e-15 ***
RentedBikeCount_Lag3  0.039661 *
RentedBikeCount_Lag4  0.781684
RentedBikeCount_Lag5  0.000207 ***
RentedBikeCount_Lag7  0.064715 .
Humidity2             0.748472
Humidity3             0.785032
Humidity4             0.924457
Humidity5             0.863772
Humidity6             0.745013
Humidity7             0.620783
Humidity8             0.590168
Humidity9             0.675712
Humidity10            0.697794
ExtremeWind            0.170915
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

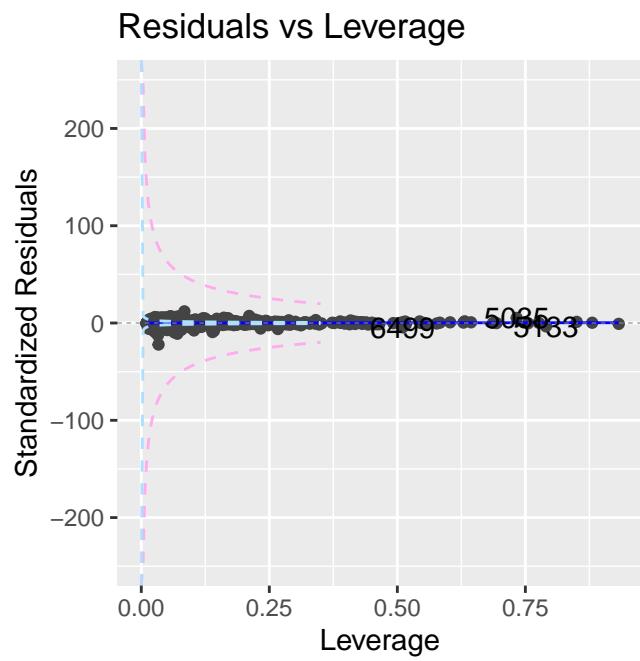
Residual standard error: 109.9 on 8328 degrees of freedom
(9 observations deleted due to missingness)
Multiple R-squared:  0.9724,    Adjusted R-squared:  0.971
F-statistic: 694.3 on 422 and 8328 DF,  p-value: < 2.2e-16

```

```
 autoplot(seoul.bike.elastic)
```



```
show_leverage(seoul.bike.elastic)
```



## A.12

Most Assailant Factors for Model (4), w/ lagged effects (and lagged interactions) and lower level time effects removed

```
elastic.bike.coef = tibble(
  Factor = names(seoul.bike.elastic$coefficients),
  Coefficient = seoul.bike.elastic$coefficients,
  P.Value = summary(seoul.bike.elastic)$coefficients[, "Pr(>|t|)"] %>% round(5) %>%
    format(scientific=F)
) %>% arrange(abs(Coefficient)) %>% desc()

elastic.bike.coef$Rank = 1:nrow(elastic.bike.coef)

elastic.bike.coef %>%
  filter(!(str_detect(Factor, "RentedBikeCount") |
    Factor %in% time.bike)) %>%
  knitr::kable()
```

Factor	Coefficient	P.Value	Rank
SolarRadiationXHour19	632.3937566	0.00000	1
SolarRadiationXHour6	-295.6523192	0.57099	7
(Intercept)	257.9125372	0.00618	9
SolarRadiationXHour8	-190.1498156	0.00000	19
Hour18XIsSummer	-186.0386073	0.00000	20
SolarRadiationXHour7	-161.9902657	0.01926	22
Hour19XIsSummer	147.4799538	0.00000	23
Hour7XIsSummer	-142.7804672	0.00000	24
Hour18XIsAutumn	-138.2988690	0.00000	26
Hour7XIsAutumn	-137.0098373	0.00000	27
Hour7XIsWinter	-117.8290759	0.00003	29
IsSummer	110.1223457	0.00037	30
SolarRadiation	-108.7547949	0.02885	31
Hour20XIsSummer	103.3673358	0.00008	32
IsHolidayXHour19	102.7848909	0.00269	33
Hour16XIsAutumn	-99.8939290	0.00000	34
Hour9XIsAutumn	-94.3501764	0.00002	35
Hour12XIsAutumn	-90.1819670	0.00000	36
Hour11XIsAutumn	-88.7067772	0.00001	37
IsAutumn	86.0934277	0.03918	38
Hour8XIsWinter	-83.4358859	0.00307	39
Hour5XIsAutumn	-81.0421061	0.00004	40

Factor	Coefficient	P.Value	Rank
Hour15XIsSummer	78.0951204	0.00505	41
Hour12XIsSummer	-77.1482358	0.01874	43
Hour21XIsAutumn	-75.8090551	0.00008	44
Hour2XIsAutumn	-74.0441968	0.00042	46
Hour9XIsWinter	-74.0174418	0.00940	47
Hour8XIsAutumn	-73.2874187	0.00100	48
Hour9XIsSummer	-72.6926432	0.01433	49
Hour3XIsAutumn	-71.9773579	0.00086	50
Hour16XIsSummer	-71.7404008	0.00765	51
IsHolidayXHour18	-65.9823381	0.05408	52
IsHolidayXHour15	-65.7846122	0.07462	53
Hour11XIsSummer	-65.7309195	0.04171	54
Hour10XIsAutumn	-65.5238979	0.00145	55
SolarRadiationXRainfall	64.4826820	0.00254	56
Hour19XIsAutumn	62.1735562	0.00424	57
Hour6XIsAutumn	-61.3341207	0.00449	58
IsHolidayXHour20	58.1347520	0.09109	59
Hour10XIsSummer	-57.2339101	0.06948	60
Hour6XIsSummer	-56.9384029	0.03764	61
IsHolidayXHour2	56.4805494	0.09591	62
Hour22XIsSummer	56.2209726	0.04877	63
Hour4XIsAutumn	-52.0898607	0.00765	64
Hour1XIsAutumn	-50.5021076	0.00704	65
Hour17XIsWinter	48.6785576	0.08740	66
IsHolidayXHour14	-45.5964840	0.23260	67
IsHolidayXHour1	43.7346082	0.19656	68
SolarRadiationXHour16	-40.9935156	0.00269	69
Hour13XIsSummer	-40.6220552	0.23661	70
VisibilityXHour20	-38.9490065	0.00317	71
RainfallXHour7	38.3888843	0.00000	72
Hour3XIsSummer	-38.3758538	0.14682	73
Hour13XIsWinter	34.9636837	0.21854	74
IsHoliday	-34.5387461	0.42732	75
Humidity8	-34.4176049	0.59017	76
SnowfallXHour16	33.9506234	0.10372	77
RainfallXHour15	32.6172438	0.00064	79
Rainfall	-32.5103788	0.03145	80
RainfallXHour23	32.3113660	0.02983	81
SnowfallXHour18	31.6585652	0.11950	82
Hour1XIsWinter	30.5220595	0.26320	83
RainfallXHour14	30.1580973	0.05030	84

Factor	Coefficient	P.Value	Rank
Humidity7	-29.9784318	0.62078	85
RainfallXHour2	29.8881984	0.01081	86
SolarRadiationXIsHoliday	29.7568944	0.02941	87
Hour23XIsWinter	29.4662508	0.27872	88
IsHolidayXHour8	-29.4622634	0.38739	89
SolarRadiationXIsWinter	-29.2893606	0.01127	90
IsHolidayXHour13	-29.1679396	0.45446	91
Hour10XIsWinter	-29.1492715	0.30151	92
RainfallXHour1	28.4272669	0.03431	93
Humidity9	-28.2963942	0.67571	94
Humidity10	-27.9505194	0.69779	95
IsHolidayXHour3	27.5901151	0.41816	96
Hour15XIsWinter	26.8155379	0.32290	97
IsWinter	26.5882497	0.14368	98
IsHolidayXHour21	26.3878378	0.44608	99
IsHolidayXHour22	26.2242027	0.44585	100
Hour23XIsAutumn	-26.1044038	0.16289	101
Hour8XIsSummer	24.1712795	0.38947	102
SolarRadiationXHour17	23.3733251	0.26893	103
Hour21XIsSummer	23.2904903	0.41164	104
VisibilityXHour22	-22.9684650	0.08264	105
WindSpeedXHour21	-22.9463813	0.18731	106
WindSpeedXIsSummer	22.6045370	0.02202	107
VisibilityXHour9	-22.5143809	0.08541	108
Hour14XIsSummer	22.1194599	0.44460	109
RainfallXHour21	22.0389602	0.00029	110
VisibilityXHour8	-21.9980553	0.06752	111
VisibilityXHour2	-21.6560391	0.07529	112
IsHolidayXHour12	-21.6428486	0.58044	113
RainfallXHour11	21.0418020	0.01024	114
Humidity2	20.8724805	0.74847	115
IsHolidayXHour7	-20.8393071	0.54298	116
VisibilityXHour14	-20.6479685	0.14119	117
RainfallXHour3	19.8233713	0.08390	118
IsHolidayXHour11	-19.6780955	0.60050	119
Humidity6	-18.9550863	0.74501	120
WindSpeedXHour12	18.8081111	0.24804	121
RainfallXHour4	18.4771630	0.01129	122
Snowfall	18.0363920	0.51197	123
RainfallXHour10	18.0329758	0.05270	124
RainfallXHour20	17.7430486	0.01158	125

Factor	Coefficient	P.Value	Rank
Hour2XIIsWinter	-17.6921097	0.51388	126
RainfallXHour13	17.5554669	0.01063	127
Hour20XIIsWinter	17.5009984	0.51755	128
SolarRadiationXIIsSummer	-17.1568762	0.07294	129
Hour3XIIsWinter	16.9321897	0.55322	130
WindSpeedXIIsHoliday	-16.7907013	0.22525	131
IsHolidayXHour5	-16.3014295	0.62920	132
Hour13XIIsAutumn	-16.2987714	0.41767	133
Hour22XIIsAutumn	-16.2412563	0.38277	134
RainfallXHour19	16.1471747	0.17494	135
RainfallXHour12	15.9919860	0.12870	136
Humidity3	15.9781408	0.78503	137
TemperatureXHour7	-15.7553351	0.00000	138
Hour6XIIsWinter	-15.7022513	0.57438	139
IsHolidayXHour17	-15.6337578	0.65227	140
RainfallXHour8	15.6068933	0.02956	141
Hour17XIIsSummer	15.4815332	0.60598	142
VisibilityXHour17	15.3420049	0.28389	143
WindSpeedXHour15	14.9324388	0.27371	144
WindSpeedXHour1	-14.6483200	0.43853	145
Hour5XIIsWinter	14.3327566	0.59116	146
IsHolidayXIIsSummer	14.0708376	0.60572	147
RainfallXHour5	14.0104695	0.27958	148
Hour23XIIsSummer	13.8557140	0.63678	149
WindSpeedXHour11	13.4500019	0.44249	150
SnowfallXHour11	13.2840910	0.22995	151
IsHolidayXHour16	-13.1249529	0.71247	152
WindSpeedXHour20	12.7334238	0.43678	153
RainfallXIIsHoliday	12.2577025	0.34460	154
TemperatureXHour8	-12.2528776	0.00000	155
VisibilityXHour12	-12.1462672	0.40231	156
RainfallXHour9	12.0843218	0.08961	157
SnowfallXHour12	12.0217503	0.35593	158
Visibility	11.8811195	0.18378	159
VisibilityXHour19	-11.7422825	0.40409	160
IsHolidayXHour23	10.9746375	0.74832	161
TemperatureXHour2	-10.6567031	0.00000	162
TemperatureXHour1	-10.5824241	0.00000	163
VisibilityXHour4	-10.4659621	0.33785	164
VisibilityXHour7	-10.4550566	0.34448	165
WindSpeedXHour13	10.4408626	0.50580	166

Factor	Coefficient	P.Value	Rank
WindSpeedXHour6	10.1773708	0.61665	167
TemperatureXHour19	-10.0007976	0.00000	168
TemperatureXHour9	-9.8902100	0.00000	169
Humidity5	-9.7593003	0.86377	170
VisibilityXHour3	-9.5612232	0.43033	171
SnowfallXHour9	-9.5460313	0.51957	172
ExtremeWind	-9.5404679	0.17092	173
WindSpeedXHour4	9.3745388	0.64175	174
TemperatureXHour10	-9.3174352	0.00000	175
TemperatureXHour22	-9.0398891	0.00000	176
DewPointTempXHour3	-8.5048412	0.00000	177
TemperatureXHour4	-8.2152364	0.00000	178
SolarRadiationXHour9	8.1757454	0.70242	179
Hour4XIsWinter	8.1720332	0.76199	180
TemperatureXHour21	-8.0391500	0.00000	181
TemperatureXHour20	-7.8363567	0.00000	182
RainfallXIsSummer	-7.6670665	0.07709	183
WindSpeed	-7.5947047	0.39821	184
VisibilityXHour21	-7.5661292	0.58014	185
TemperatureXHour14	-7.5506808	0.00000	186
IsHolidayXHour10	7.3952259	0.83813	187
DewPointTemp	7.2285843	0.07863	188
WindSpeedXHour14	6.9672475	0.63673	189
WindSpeedXHour7	-6.9514881	0.74509	190
TemperatureXHour6	-6.8690508	0.00001	191
Hour17XIsAutumn	-6.7842608	0.76012	192
TemperatureXHour5	-6.7758414	0.00000	193
SolarRadiationXHour18	-6.7491572	0.81299	194
TemperatureXHour23	-6.7281601	0.00000	195
WindSpeedXHour3	-6.5776912	0.74257	196
RainfallXHour18	6.3978940	0.34705	197
IsHolidayXHour6	6.3901999	0.85251	198
DewPointTempXHour13	-6.2181759	0.00011	199
TemperatureXHour15	-6.2122379	0.00001	200
VisibilityXHour1	-6.1703557	0.61305	201
TemperatureXHour12	-6.1599016	0.00000	202
TemperatureXHour11	-5.6129227	0.00017	203
Humidity4	-5.3890080	0.92446	204
WindSpeedXHour19	5.1780151	0.73704	205
WindSpeedXHour22	5.1011051	0.76906	206
RainfallXHour16	-5.0837081	0.76114	207

Factor	Coefficient	P.Value	Rank
SnowfallXHour14	5.0336671	0.75239	208
TemperatureXHour17	-5.0032557	0.00058	209
IsHolidayXHour4	4.9464580	0.88376	210
WindSpeedXSnowfall	4.8572918	0.65067	211
Temperature	4.7197279	0.14692	212
WindSpeedXHour10	4.6421541	0.79899	214
VisibilityXSnowfall	-4.6397038	0.31568	215
Hour11XIsWinter	4.6166564	0.87217	216
SnowfallXHour20	4.3505154	0.81918	217
DewPointTempXSolarRadiation	-4.2838631	0.01442	218
SnowfallXHour1	4.2633546	0.79363	219
HumidityXHour3	3.9169944	0.00000	221
RainfallXHour22	3.5894733	0.79750	222
HumidityXHour7	3.5137862	0.00000	223
SnowfallXHour3	3.4898972	0.83613	224
SnowfallXHour21	3.4169769	0.85317	225
SnowfallXHour13	-3.4007202	0.81023	226
WindSpeedXHour2	3.0658824	0.87549	227
WindSpeedXSolarRadiation	-3.0082279	0.56337	228
SnowfallXHour4	2.9546764	0.85697	229
TemperatureXIsSummer	-2.9355044	0.05481	230
HumidityXHour13	2.7497105	0.00149	231
HumidityXHour6	2.6881888	0.00001	232
TemperatureXIsAutumn	-2.4938589	0.00020	233
HumidityXHour1	2.4134171	0.00022	234
SnowfallXIsHoliday	-2.3956162	0.93181	235
SnowfallXHour6	-2.3748987	0.88206	236
WindSpeedXHour5	2.3582411	0.91004	237
VisibilityXHour11	-2.3556694	0.87178	238
HumidityXSolarRadiation	2.2080640	0.00098	240
HumidityXHour5	2.1880608	0.00018	241
Humidity	-2.0779980	0.04969	242
SnowfallXHour22	2.0756713	0.90983	243
TemperatureXSolarRadiation	2.0271660	0.21031	244
RainfallXIsWinter	-2.0186331	0.84277	245
DewPointTempXIsSummer	-1.9649557	0.08897	246
HumidityXHour17	1.9343328	0.00558	247
HumidityXHour4	1.9095168	0.00365	248
HumidityXHour21	1.8399418	0.00564	249
HumidityXHour2	1.8314949	0.00611	250
HumidityXHour10	1.6868865	0.00635	251

Factor	Coefficient	P.Value	Rank
WindSpeedXHour9	-1.6719032	0.93300	252
RainfallXIsAutumn	-1.3097424	0.78618	254
TemperatureXIsWinter	-1.2988725	0.44838	255
IsHolidayXIsAutumn	1.2785364	0.94320	256
HumidityXHour22	1.2683643	0.05413	257
WindSpeedXRainfall	1.2580799	0.73492	258
TemperatureXHour18	-1.1204902	0.40103	259
HumidityXHour18	1.0306352	0.08114	261
VisibilityXRainfall	0.9790939	0.62863	262
HumidityXHour9	0.9267568	0.23992	264
HumidityXHour23	0.9214170	0.10301	265
HumidityXHour8	0.9060618	0.21661	266
HumidityXHour20	0.8647015	0.18023	268
SnowfallXHour17	0.8382446	0.96800	269
RainfallXSnowfall	0.6704427	0.81392	273
VisibilityXIsAutumn	0.6546695	0.90935	274
Hour21XIsWinter	0.6307062	0.98234	275
HumidityXHour19	0.5621068	0.39549	278
HumidityXHour14	-0.5159993	0.43474	281
HumidityXHour12	0.4342499	0.53901	284
DewPointTempXRainfall	0.4219095	0.29884	285
HumidityXIsHoliday	0.4201831	0.42156	286
DewPointTempXSnowfall	-0.4171707	0.50414	287
HumidityXHour11	0.3324090	0.63850	291
VisibilityXDewPointTemp	-0.2802812	0.37672	300
DewPointTempXIsHoliday	-0.2476912	0.81269	307
HumidityXHour15	-0.2258709	0.70874	311
DewPointTempXIsWinter	-0.1912198	0.86390	315
HumidityXHour16	0.1758514	0.76265	319
WindSpeedXDewPointTemp	-0.0935028	0.76977	337
TemperatureXDewPointTemp	-0.0896531	0.00768	339
HumidityXVisibility	0.0002682	0.04010	411

### A.13

The full model (Model 4), can be written as,

$$\begin{aligned} \text{RentedBikeCount}_{st} = & \beta_0 + \sum_{i=1}^9 \beta_i I(10i \leq \text{Humidity}_{st} < 10(i+1)) + \beta_{10} \ln(\text{Visibility}_{st} + 1) + \beta_{11} \text{Rainfall}_{st} + \beta_{12} \text{Temperature}_{st} + \beta_{13} (\ln \text{WindSpeed}_{st} + 1) + \beta_{14} I(\text{ExtremeWind}_{st} = 1) + \beta_{15} \text{DewPointTemp}_{st} + \beta_{16} \text{Snowfall}_{st} + \beta_{17} \text{SolarRadiation}_{st} + \\ & \beta_{18} I(\text{Day}_t = \text{Holiday}_t) + \beta_{19} I(\text{Season}_s = \text{Winter}) + \beta_{20} I(\text{Season}_s = \text{Summer}) + \beta_{21} I(\text{Season}_s = \end{aligned}$$

$$\begin{aligned}
& \text{Autumn}) + \sum_{i=1}^{23} \beta_{21+i} I(\text{Hour}_t = i) + \sum_{h=1}^9 \sum_{i=1}^{23} \beta_{44+ih} I(\text{Hour}_t = i) I(10h \leq \text{Humidity}_{st} < \\
& 10(h+1)) + \sum_{i=1}^9 \beta_{207+i} I(\text{Hour}_t = i) I(\text{Day}_t = \text{Holiday}) + \\
& \beta_{217} \text{Temperature}_{st} \text{DewPointTemp}_{st} + \beta_{218} \ln(\text{WindSpeed}_{st} + 1) I(\text{Day}_t = \text{Holiday}_{st}) + \\
& \beta_{218} \text{SolarRadiation}_{st} \text{Rainfall}_{st} + \beta_{219} \text{SolarRadiation}_{st} I(\text{Day}_t = \text{Holiday}_{st}) + \beta_{220} \text{Snowfall}_{st} I(\text{ExtremeWind}_{st} = \\
& 1) + \\
& \beta_{221} \text{Temperature}_{st} I(\text{Hour}_t = 1) + \beta_{222} \text{Temperature}_{st} I(\text{Hour}_t = 7) + \beta_{223} \text{Temperature}_{st} I(\text{Hour}_t = \\
& 18) + \beta_{224} \ln(\text{WindSpeed}_{st} + 1) I(\text{Hour}_t = 1) + \beta_{225} \ln(\text{WindSpeed}_{st} + 1) I(\text{Hour}_t = \\
& 3) + \beta_{226} \ln(\text{WindSpeed}_{st} + 1) I(\text{Hour}_t = 11) + \\
& \beta_{227} \ln(\text{WindSpeed}_{st} + 1) I(\text{Hour}_t = 18) + \beta_{228} \ln(\text{Visibility}_{st} + 1) I(\text{Hour}_t = 2) + \dots + \\
& \beta_{230} \ln(\text{Visibility}_{st} + 1) I(\text{Hour}_t = 4) + \beta_{231} \ln(\text{Visibility}_{st} + 1) I(\text{Hour}_t = 11) + \beta_{232} \text{DewPointTemp}_{st} I(\text{Hour}_t = \\
& 5) + \beta_{233} \text{DewPointTemp}_{st} I(\text{Hour}_t = 8) + \\
& \beta_{234} \text{DewPointTemp}_{st} I(\text{Hour}_t = 11) + \beta_{235} \text{DewPointTemp}_{st} I(\text{Hour}_t = 16) + \beta_{236} \text{DewPointTemp}_{st} I(\text{Hour}_t = \\
& 17) + \beta_{237} \text{DewPointTemp}_{st} I(\text{Hour}_t = 19) + \dots + \beta_{239} \text{DewPointTemp}_{st} I(\text{Hour}_t = \\
& 21) + \beta_{240} \text{SolarRadiation}_{st} I(\text{Hour}_t = 8) + \\
& \beta_{241} \text{SolarRadiation}_{st} I(\text{Hour}_t = 19) + \beta_{242} \text{Rainfall}_{st} I(\text{Hour}_t = 9) + \beta_{243} \text{Rainfall}_{st} I(\text{Hour}_t = \\
& 13) + \beta_{244} \text{Rainfall}_{st} I(\text{Hour}_t = 17) + \beta_{245} \text{Rainfall}_{st} I(\text{Hour}_t = 19) + \beta_{246} \text{Rainfall}_{st} I(\text{Hour}_t = \\
& 20) + \beta_{247} \text{Snowfall}_{st} I(\text{Hour}_t = 7) + \beta_{248} \text{Snowfall}_{st} I(\text{Hour}_t = 9) + \beta_{249} \text{Snowfall}_{st} I(\text{Hour}_t = 13) + \\
& \beta_{250} I(\text{ExtremeWind}_{st} = 1) I(\text{Hour}_t = 8) + \beta_{251} I(\text{ExtremeWind}_{st} = 1) I(\text{Hour}_t = \\
& 18) + \beta_{252} I(\text{ExtremeWind}_{st} = 1) I(\text{Hour}_t = 19) + \beta_{253} \ln(\text{WindSpeed}_{st} + 1) I(\text{Season}_s = \\
& \text{Winter}) + \beta_{254} \ln(\text{Visibility}_{st} + 1) I(\text{Season}_s = \text{Winter}) + \beta_{255} \text{SolarRadiation}_{st} I(\text{Season}_s = \\
& \text{Summer}) + \\
& \beta_{256} \text{SolarRadiation}_{st} I(\text{Season}_s = \text{Autumn}) + \beta_{257} \text{Rainfall}_{st} I(\text{Season}_s = \text{Winter}) + \\
& \sum_{i=1}^{23} \sum_{\text{All } j \in \text{Seasons}, j \neq \text{Spring}} \beta_{257+i+j} I(\text{Hour}_t = i) I(\text{Season}_s = j) + \sum_{i=1}^3 \beta_{327+i} I(60 + \\
& 10i \leq \text{Humidity}_{st} < 60 + 10(i+1)) I(\text{Season}_s = \text{Autumn}) + \\
& \beta_{331} I(60 \leq \text{Humidity}_{st} < 70) I(\text{Season}_s = \text{Summer}) + \beta_{332} \text{Temperature}_{st} I(20 \leq \text{Humidity}_{st} < \\
& 30) + \beta_{333} \ln(\text{WindSpeed}_{st} + 1) I(90 \leq \text{Humidity}_{st} < 100) + \beta_{334} \text{SolarRadiation}_{st} I(60 \leq \\
& \text{Humidity}_{st} < 70) + \sum_{i=1}^4 \beta_{335+i} \text{SolarRadiation}_{st} I(50 + 10i \leq \text{Humidity}_{st} < 60 + 10(i+1)) + \\
& \sum_{i=1}^3 \beta_{339+i} \text{Rainfall}_{st} I(30 + 10i \leq \text{Humidity}_{st} < 30 + 10(i+1)) + \beta_{343} \text{Rainfall}_{st} I(90 \leq \\
& \text{Humidity}_{st} < 100) + \beta_{344} I(\text{ExtremeWind}_{st} = 1) I(30 \leq \text{Humidity}_{st} < 40) + \beta_{345} I(\text{ExtremeWind}_{st} = \\
& 1) I(60 \leq \text{Humidity}_{st} < 70) + \beta_{346} I(\text{ExtremeWind}_{st} = 1) I(70 \leq \text{Humidity}_{st} < 80) + \\
& \sum_{p=1}^9 \delta_p \text{RentedBikeCount}_{st-p} + \sum_{p=1}^9 \sum_{t=1}^{23} \delta_{9+pt} \text{RentedBikeCount}_{st-p} I(\text{Hour}_t = t) + \\
& \sum_{p=1}^9 \sum_{i=1}^9 \delta_{216+ip} \text{RentedBikeCount}_{st-p} I(10i < \text{Humidity}_{st} \leq 10(i+1)) + \\
& \delta_{298} \text{RentedBikeCount}_{st-1} I(\text{Season}_s = \text{Autumn}) + \delta_{299} \text{RentedBikeCount}_{st-3} I(\text{Season}_s = \\
& \text{Summer}) + \delta_{300} \text{RentedBikeCount}_{st-6} I(\text{Season}_s = \text{Summer}) + \delta_{301} \text{RentedBikeCount}_{st-9} I(\text{Season}_s = \\
& \text{Autumn}) + \\
& \delta_{302} \text{RentedBikeCount}_{st-2} \text{RentedBikeCount}_{st-5} + \delta_{303} \text{RentedBikeCount}_{st-2} \text{RentedBikeCount}_{st-6} + \\
& \delta_{304} \text{RentedBikeCount}_{st-5} I(\text{ExtremeWind}_{st} = 1) + \delta_{305} \text{RentedBikeCount}_{st-1} \text{Temperature}_{st} + \\
& \delta_{306} \text{RentedBikeCount}_{st-1} \ln(\text{WindSpeed}_{st} + 1) + \delta_{307} \text{RentedBikeCount}_{st-9} \ln(\text{WindSpeed}_{st} + \\
& 1) + \delta_{308} \text{RentedBikeCount}_{st-1} \ln(\text{Visibility}_{st} + 1) + \delta_{309} \text{RentedBikeCount}_{st-1} \text{SolarRadiation}_{st} + \\
& \delta_{310} \text{RentedBikeCount}_{st-9} \text{SolarRadiation}_{st} + \\
& \delta_{311} \text{RentedBikeCount}_{st-1} \text{Rainfall}_{st} + \delta_{312} \text{RentedBikeCount}_{st-3} \text{Rainfall}_{st} + \delta_{313} \text{RentedBikeCount}_{st-8} \text{Rainfall}_{st} +
\end{aligned}$$

$$\delta_{314} \text{RentedBikeCount}_{st-9} \text{Snowfall}_{st} + \eta_{st}$$

$$\eta_{st} \stackrel{iid}{\sim} N(0, \sigma^2)$$

NOTE: Not all parameter coefficients are estimated to be  $> 0$ . See model output to see which coefficients.

## A.14

Model Output for Model 4

```
summary(seoul.bike.elastic)
```

Call:

```
lm(formula = RentedBikeCount ~ ., data = seoul.bike[c("RentedBikeCount",
  elastic.bike.factors)])
```

Residuals:

	Min	1Q	Median	3Q	Max
	-2392.38	-35.14	1.35	38.94	1261.67

Coefficients:

	Estimate	Std. Error	t value
(Intercept)	2.579e+02	9.417e+01	2.739
Humidity	-2.078e+00	1.059e+00	-1.963
Visibility	1.188e+01	8.938e+00	1.329
SolarRadiation	-1.088e+02	4.975e+01	-2.186
Rainfall	-3.251e+01	1.511e+01	-2.152
Hour1	-2.815e+02	1.147e+02	-2.453
Hour2	-1.267e+02	1.171e+02	-1.082
Hour3	-4.051e+02	1.246e+02	-3.252
Hour4	-2.207e+02	1.069e+02	-2.064
Hour5	-2.976e+02	4.992e+01	-5.960
Hour6	-3.166e+02	5.115e+01	-6.191
Hour7	-2.266e+02	1.100e+02	-2.061
Hour8	7.467e+01	1.185e+02	0.630
Hour9	-4.662e+00	1.252e+02	-0.037
Hour10	-2.505e+02	5.058e+01	-4.953
Hour11	-1.646e+02	1.306e+02	-1.261
Hour12	-1.423e+02	1.245e+02	-1.143
Hour13	-4.092e+02	6.201e+01	-6.598

Hour14	-3.307e+01	1.200e+02	-0.276
Hour15	-2.289e+02	4.709e+01	-4.861
Hour16	-2.203e+02	4.111e+01	-5.358
Hour17	-4.520e+02	1.291e+02	-3.501
Hour18	-2.288e+02	3.848e+01	-5.946
Hour19	-2.271e+02	1.235e+02	-1.839
Hour20	-3.920e+00	1.203e+02	-0.033
Hour21	-2.041e+02	1.242e+02	-1.643
Hour22	-7.760e+01	1.186e+02	-0.654
Hour23	-2.407e+02	4.432e+01	-5.430
IsAutumn	8.609e+01	4.174e+01	2.063
RentedBikeCount_Lag1	7.764e-01	3.177e-02	24.440
RentedBikeCount_Lag6	-1.536e-02	2.585e-02	-0.594
RentedBikeCount_Lag8	1.496e-02	2.338e-02	0.640
RentedBikeCount_Lag9	5.582e-02	2.669e-02	2.092
HumidityXVisibility	2.682e-04	1.307e-04	2.053
HumidityXSolarRadiation	2.208e+00	6.699e-01	3.296
HumidityXIsholiday	4.202e-01	5.228e-01	0.804
HumidityXRentedBikeCount_Lag1	7.188e-04	3.139e-04	2.290
HumidityXRentedBikeCount_Lag6	5.125e-04	2.749e-04	1.864
HumidityXRentedBikeCount_Lag9	-9.721e-04	2.600e-04	-3.739
TemperatureXDewPointTemp	-8.965e-02	3.362e-02	-2.666
TemperatureXSolarRadiation	2.027e+00	1.618e+00	1.253
TemperatureXRentedBikeCount_Lag1	2.619e-03	9.608e-04	2.726
TemperatureXRentedBikeCount_Lag2	1.372e-03	1.305e-03	1.051
TemperatureXRentedBikeCount_Lag3	1.526e-03	1.586e-03	0.962
WindSpeedXDewPointTemp	-9.350e-02	3.195e-01	-0.293
WindSpeedXSolarRadiation	-3.008e+00	5.206e+00	-0.578
WindSpeedXRainfall	1.258e+00	3.716e+00	0.339
WindSpeedXSnowfall	4.857e+00	1.073e+01	0.453
WindSpeedXIsholiday	-1.679e+01	1.384e+01	-1.213
WindSpeedXRentedBikeCount_Lag1	1.130e-03	6.582e-03	0.172
VisibilityXDewPointTemp	-2.803e-01	3.171e-01	-0.884
VisibilityXRainfall	9.791e-01	2.024e+00	0.484
VisibilityXSnowfall	-4.640e+00	4.624e+00	-1.003
VisibilityXRentedBikeCount_Lag7	-9.229e-03	4.798e-03	-1.924
DewPointTempXSolarRadiation	-4.284e+00	1.751e+00	-2.447
DewPointTempXRainfall	4.219e-01	4.061e-01	1.039
DewPointTempXSnowfall	-4.172e-01	6.245e-01	-0.668
DewPointTempXIsholiday	-2.477e-01	1.045e+00	-0.237
DewPointTempXRentedBikeCount_Lag3	-3.992e-04	1.126e-03	-0.355
SolarRadiationXRainfall	6.448e+01	2.136e+01	3.019
SolarRadiationXIsholiday	2.976e+01	1.366e+01	2.178

SolarRadiationXRentedBikeCount_Lag1	1.831e-02	1.378e-02	1.329
SolarRadiationXRentedBikeCount_Lag2	8.049e-03	1.242e-02	0.648
SolarRadiationXRentedBikeCount_Lag4	1.140e-02	9.733e-03	1.171
SolarRadiationXRentedBikeCount_Lag5	-1.433e-02	7.944e-03	-1.804
SolarRadiationXRentedBikeCount_Lag9	3.888e-02	9.613e-03	4.044
RainfallXSnowfall	6.704e-01	2.848e+00	0.235
RainfallXIsHoliday	1.226e+01	1.297e+01	0.945
RainfallXRentedBikeCount_Lag1	-8.848e-02	1.439e-02	-6.149
RainfallXRentedBikeCount_Lag2	6.235e-04	1.170e-02	0.053
RainfallXRentedBikeCount_Lag4	2.097e-02	9.339e-03	2.246
RainfallXRentedBikeCount_Lag8	-5.978e-03	5.402e-03	-1.107
SnowfallXIsHoliday	-2.396e+00	2.800e+01	-0.086
SnowfallXRentedBikeCount_Lag2	1.365e-02	2.788e-02	0.490
SnowfallXRentedBikeCount_Lag9	-1.038e-02	2.459e-02	-0.422
IsHolidayXRentedBikeCount_Lag4	-9.445e-03	1.344e-02	-0.703
RentedBikeCount_Lag1XRentedBikeCount_Lag2	-9.069e-05	1.078e-05	-8.412
RentedBikeCount_Lag1XRentedBikeCount_Lag7	3.370e-05	1.783e-05	1.890
RentedBikeCount_Lag1XRentedBikeCount_Lag8	-6.871e-05	2.390e-05	-2.875
RentedBikeCount_Lag1XRentedBikeCount_Lag9	1.985e-05	1.786e-05	1.111
RentedBikeCount_Lag2XRentedBikeCount_Lag3	5.698e-05	1.564e-05	3.643
RentedBikeCount_Lag3XRentedBikeCount_Lag4	1.109e-06	1.734e-05	0.064
RentedBikeCount_Lag3XRentedBikeCount_Lag5	-3.866e-05	1.990e-05	-1.943
RentedBikeCount_Lag4XRentedBikeCount_Lag5	1.264e-05	1.696e-05	0.745
RentedBikeCount_Lag4XRentedBikeCount_Lag9	1.052e-05	1.803e-05	0.584
RentedBikeCount_Lag5XRentedBikeCount_Lag6	2.973e-05	1.108e-05	2.682
RentedBikeCount_Lag5XRentedBikeCount_Lag9	-3.851e-07	1.652e-05	-0.023
RentedBikeCount_Lag7XRentedBikeCount_Lag8	-1.795e-05	7.306e-06	-2.457
HumidityXHour1	2.413e+00	6.537e-01	3.692
HumidityXHour2	1.831e+00	6.678e-01	2.743
HumidityXHour3	3.917e+00	8.456e-01	4.632
HumidityXHour4	1.910e+00	6.567e-01	2.908
HumidityXHour5	2.188e+00	5.843e-01	3.745
HumidityXHour6	2.688e+00	6.015e-01	4.469
HumidityXHour7	3.514e+00	6.853e-01	5.127
HumidityXHour8	9.061e-01	7.332e-01	1.236
HumidityXHour9	9.268e-01	7.885e-01	1.175
HumidityXHour10	1.687e+00	6.180e-01	2.730
HumidityXHour11	3.324e-01	7.075e-01	0.470
HumidityXHour12	4.342e-01	7.069e-01	0.614
HumidityXHour13	2.750e+00	8.653e-01	3.178
HumidityXHour14	-5.160e-01	6.606e-01	-0.781
HumidityXHour15	-2.259e-01	6.046e-01	-0.374
HumidityXHour16	1.759e-01	5.823e-01	0.302

HumidityXHour17	1.934e+00	6.977e-01	2.772
HumidityXHour18	1.031e+00	5.909e-01	1.744
HumidityXHour19	5.621e-01	6.615e-01	0.850
HumidityXHour20	8.647e-01	6.452e-01	1.340
HumidityXHour21	1.840e+00	6.646e-01	2.768
HumidityXHour22	1.268e+00	6.585e-01	1.926
HumidityXHour23	9.214e-01	5.651e-01	1.631
TemperatureXHour1	-1.058e+01	1.355e+00	-7.809
TemperatureXHour2	-1.066e+01	1.369e+00	-7.782
TemperatureXHour4	-8.215e+00	1.324e+00	-6.205
TemperatureXHour5	-6.776e+00	1.339e+00	-5.059
TemperatureXHour6	-6.869e+00	1.510e+00	-4.549
TemperatureXHour7	-1.576e+01	1.473e+00	-10.699
TemperatureXHour8	-1.225e+01	1.520e+00	-8.061
TemperatureXHour9	-9.890e+00	1.546e+00	-6.399
TemperatureXHour10	-9.317e+00	1.517e+00	-6.144
TemperatureXHour11	-5.613e+00	1.494e+00	-3.758
TemperatureXHour12	-6.160e+00	1.310e+00	-4.704
TemperatureXHour14	-7.551e+00	1.264e+00	-5.974
TemperatureXHour15	-6.212e+00	1.395e+00	-4.453
TemperatureXHour17	-5.003e+00	1.453e+00	-3.442
TemperatureXHour18	-1.120e+00	1.334e+00	-0.840
TemperatureXHour19	-1.000e+01	1.301e+00	-7.684
TemperatureXHour20	-7.836e+00	1.518e+00	-5.162
TemperatureXHour21	-8.039e+00	1.506e+00	-5.338
TemperatureXHour22	-9.040e+00	1.289e+00	-7.015
TemperatureXHour23	-6.728e+00	1.460e+00	-4.609
WindSpeedXHour1	-1.465e+01	1.891e+01	-0.775
WindSpeedXHour2	3.066e+00	1.957e+01	0.157
WindSpeedXHour3	-6.578e+00	2.003e+01	-0.328
WindSpeedXHour4	9.375e+00	2.015e+01	0.465
WindSpeedXHour5	2.358e+00	2.087e+01	0.113
WindSpeedXHour6	1.018e+01	2.033e+01	0.501
WindSpeedXHour7	-6.951e+00	2.138e+01	-0.325
WindSpeedXHour9	-1.672e+00	1.989e+01	-0.084
WindSpeedXHour10	4.642e+00	1.823e+01	0.255
WindSpeedXHour11	1.345e+01	1.751e+01	0.768
WindSpeedXHour12	1.881e+01	1.628e+01	1.155
WindSpeedXHour13	1.044e+01	1.569e+01	0.665
WindSpeedXHour14	6.967e+00	1.475e+01	0.472
WindSpeedXHour15	1.493e+01	1.364e+01	1.095
WindSpeedXHour19	5.178e+00	1.542e+01	0.336
WindSpeedXHour20	1.273e+01	1.637e+01	0.778

WindSpeedXHour21	-2.295e+01	1.740e+01	-1.319
WindSpeedXHour22	5.101e+00	1.737e+01	0.294
VisibilityXHour1	-6.170e+00	1.220e+01	-0.506
VisibilityXHour2	-2.166e+01	1.217e+01	-1.779
VisibilityXHour3	-9.561e+00	1.212e+01	-0.789
VisibilityXHour4	-1.047e+01	1.092e+01	-0.958
VisibilityXHour7	-1.046e+01	1.106e+01	-0.945
VisibilityXHour8	-2.200e+01	1.203e+01	-1.828
VisibilityXHour9	-2.251e+01	1.309e+01	-1.720
VisibilityXHour11	-2.356e+00	1.460e+01	-0.161
VisibilityXHour12	-1.215e+01	1.450e+01	-0.838
VisibilityXHour14	-2.065e+01	1.403e+01	-1.472
VisibilityXHour17	1.534e+01	1.432e+01	1.072
VisibilityXHour19	-1.174e+01	1.407e+01	-0.834
VisibilityXHour20	-3.895e+01	1.319e+01	-2.952
VisibilityXHour21	-7.566e+00	1.368e+01	-0.553
VisibilityXHour22	-2.297e+01	1.323e+01	-1.736
DewPointTempXHour3	-8.505e+00	1.500e+00	-5.672
DewPointTempXHour13	-6.218e+00	1.610e+00	-3.863
SolarRadiationXHour6	-2.957e+02	5.218e+02	-0.567
SolarRadiationXHour7	-1.620e+02	6.920e+01	-2.341
SolarRadiationXHour8	-1.901e+02	2.971e+01	-6.400
SolarRadiationXHour9	8.176e+00	2.140e+01	0.382
SolarRadiationXHour16	-4.099e+01	1.366e+01	-3.002
SolarRadiationXHour17	2.337e+01	2.114e+01	1.106
SolarRadiationXHour18	-6.749e+00	2.853e+01	-0.237
SolarRadiationXHour19	6.324e+02	5.749e+01	11.000
RainfallXHour1	2.843e+01	1.343e+01	2.117
RainfallXHour2	2.989e+01	1.172e+01	2.549
RainfallXHour3	1.982e+01	1.147e+01	1.729
RainfallXHour4	1.848e+01	7.292e+00	2.534
RainfallXHour5	1.401e+01	1.296e+01	1.081
RainfallXHour7	3.839e+01	7.958e+00	4.824
RainfallXHour8	1.561e+01	7.171e+00	2.176
RainfallXHour9	1.208e+01	7.118e+00	1.698
RainfallXHour10	1.803e+01	9.307e+00	1.938
RainfallXHour11	2.104e+01	8.193e+00	2.568
RainfallXHour12	1.599e+01	1.053e+01	1.519
RainfallXHour13	1.756e+01	6.871e+00	2.555
RainfallXHour14	3.016e+01	1.541e+01	1.958
RainfallXHour15	3.262e+01	9.549e+00	3.416
RainfallXHour16	-5.084e+00	1.672e+01	-0.304
RainfallXHour18	6.398e+00	6.804e+00	0.940

RainfallXHour19	1.615e+01	1.190e+01	1.357
RainfallXHour20	1.774e+01	7.026e+00	2.525
RainfallXHour21	2.204e+01	6.073e+00	3.629
RainfallXHour22	3.589e+00	1.399e+01	0.257
RainfallXHour23	3.231e+01	1.487e+01	2.173
SnowfallXHour1	4.263e+00	1.630e+01	0.262
SnowfallXHour3	3.490e+00	1.687e+01	0.207
SnowfallXHour4	2.955e+00	1.639e+01	0.180
SnowfallXHour6	-2.375e+00	1.601e+01	-0.148
SnowfallXHour9	-9.546e+00	1.482e+01	-0.644
SnowfallXHour11	1.328e+01	1.106e+01	1.201
SnowfallXHour12	1.202e+01	1.302e+01	0.923
SnowfallXHour13	-3.401e+00	1.416e+01	-0.240
SnowfallXHour14	5.034e+00	1.595e+01	0.315
SnowfallXHour16	3.395e+01	2.086e+01	1.627
SnowfallXHour17	8.382e-01	2.089e+01	0.040
SnowfallXHour18	3.166e+01	2.033e+01	1.557
SnowfallXHour20	4.351e+00	1.903e+01	0.229
SnowfallXHour21	3.417e+00	1.846e+01	0.185
SnowfallXHour22	2.076e+00	1.833e+01	0.113
IsHolidayXHour1	4.373e+01	3.386e+01	1.292
IsHolidayXHour2	5.648e+01	3.392e+01	1.665
IsHolidayXHour3	2.759e+01	3.408e+01	0.810
IsHolidayXHour4	4.946e+00	3.383e+01	0.146
IsHolidayXHour5	-1.630e+01	3.376e+01	-0.483
IsHolidayXHour6	6.390e+00	3.437e+01	0.186
IsHolidayXHour7	-2.084e+01	3.426e+01	-0.608
IsHolidayXHour8	-2.946e+01	3.408e+01	-0.864
IsHolidayXHour10	7.395e+00	3.620e+01	0.204
IsHolidayXHour11	-1.968e+01	3.757e+01	-0.524
IsHolidayXHour12	-2.164e+01	3.915e+01	-0.553
IsHolidayXHour13	-2.917e+01	3.899e+01	-0.748
IsHolidayXHour14	-4.560e+01	3.820e+01	-1.194
IsHolidayXHour15	-6.578e+01	3.690e+01	-1.783
IsHolidayXHour16	-1.312e+01	3.561e+01	-0.369
IsHolidayXHour17	-1.563e+01	3.469e+01	-0.451
IsHolidayXHour18	-6.598e+01	3.425e+01	-1.926
IsHolidayXHour19	1.028e+02	3.424e+01	3.002
IsHolidayXHour20	5.813e+01	3.440e+01	1.690
IsHolidayXHour21	2.639e+01	3.463e+01	0.762
IsHolidayXHour22	2.622e+01	3.440e+01	0.762
IsHolidayXHour23	1.097e+01	3.420e+01	0.321
RentedBikeCount_Lag1XHour3	-2.809e-01	9.838e-02	-2.856

RentedBikeCount_Lag1XHour6	2.221e+00	1.365e-01	16.272
RentedBikeCount_Lag1XHour7	1.628e+00	4.551e-02	35.769
RentedBikeCount_Lag1XHour8	8.842e-01	2.284e-02	38.706
RentedBikeCount_Lag1XHour9	-2.465e-01	1.872e-02	-13.166
RentedBikeCount_Lag1XHour10	2.503e-01	4.278e-02	5.851
RentedBikeCount_Lag1XHour12	2.648e-01	8.660e-02	3.058
RentedBikeCount_Lag1XHour13	2.666e-01	5.745e-02	4.640
RentedBikeCount_Lag1XHour14	5.203e-01	5.563e-02	9.354
RentedBikeCount_Lag1XHour15	4.701e-01	2.514e-02	18.696
RentedBikeCount_Lag1XHour16	2.928e-01	5.899e-02	4.963
RentedBikeCount_Lag1XHour17	3.525e-01	5.878e-02	5.997
RentedBikeCount_Lag1XHour18	5.661e-01	2.452e-02	23.086
RentedBikeCount_Lag1XHour20	3.215e-01	3.099e-02	10.372
RentedBikeCount_Lag1XHour21	2.033e-01	3.176e-02	6.400
RentedBikeCount_Lag1XHour23	1.369e-01	3.585e-02	3.819
RentedBikeCount_Lag2XHour1	2.353e-01	6.253e-02	3.763
RentedBikeCount_Lag2XHour2	1.420e-01	4.141e-02	3.428
RentedBikeCount_Lag2XHour3	2.745e-01	9.661e-02	2.842
RentedBikeCount_Lag2XHour4	-2.518e-02	9.544e-02	-0.264
RentedBikeCount_Lag2XHour6	-8.364e-01	1.386e-01	-6.036
RentedBikeCount_Lag2XHour11	4.662e-01	4.885e-02	9.542
RentedBikeCount_Lag2XHour12	2.936e-01	1.186e-01	2.477
RentedBikeCount_Lag2XHour16	3.126e-01	1.231e-01	2.540
RentedBikeCount_Lag2XHour17	1.731e-01	8.707e-02	1.988
RentedBikeCount_Lag2XHour22	7.172e-02	5.263e-02	1.363
RentedBikeCount_Lag3XHour1	-5.793e-02	5.614e-02	-1.032
RentedBikeCount_Lag3XHour2	4.609e-02	7.205e-02	0.640
RentedBikeCount_Lag3XHour3	8.663e-02	7.277e-02	1.190
RentedBikeCount_Lag3XHour4	9.984e-02	7.691e-02	1.298
RentedBikeCount_Lag3XHour12	4.235e-02	7.164e-02	0.591
RentedBikeCount_Lag3XHour13	2.576e-01	8.258e-02	3.120
RentedBikeCount_Lag3XHour14	-5.849e-02	1.002e-01	-0.584
RentedBikeCount_Lag3XHour16	-1.810e-01	1.381e-01	-1.310
RentedBikeCount_Lag3XHour17	-1.430e-01	1.192e-01	-1.200
RentedBikeCount_Lag3XHour19	1.205e-01	6.431e-02	1.874
RentedBikeCount_Lag3XHour20	2.838e-01	6.040e-02	4.698
RentedBikeCount_Lag3XHour21	1.787e-01	3.099e-02	5.768
RentedBikeCount_Lag3XHour22	2.114e-01	6.730e-02	3.141
RentedBikeCount_Lag4XHour2	-1.838e-02	9.773e-02	-0.188
RentedBikeCount_Lag4XHour3	-2.414e-02	6.862e-02	-0.352
RentedBikeCount_Lag4XHour11	-9.060e-02	4.561e-02	-1.986
RentedBikeCount_Lag4XHour14	-4.589e-02	8.927e-02	-0.514
RentedBikeCount_Lag4XHour16	-8.500e-03	9.435e-02	-0.090

RentedBikeCount_Lag4XHour17	1.096e-01	9.656e-02	1.135
RentedBikeCount_Lag4XHour19	3.598e-01	8.890e-02	4.047
RentedBikeCount_Lag4XHour20	-2.631e-01	8.803e-02	-2.988
RentedBikeCount_Lag4XHour21	-3.757e-02	4.647e-02	-0.809
RentedBikeCount_Lag4XHour22	3.264e-02	3.632e-02	0.899
RentedBikeCount_Lag5XHour2	1.414e-01	9.967e-02	1.418
RentedBikeCount_Lag5XHour3	5.821e-02	5.054e-02	1.152
RentedBikeCount_Lag5XHour5	1.177e-01	3.319e-02	3.545
RentedBikeCount_Lag5XHour9	9.372e-01	2.796e-01	3.352
RentedBikeCount_Lag5XHour10	-1.603e-01	2.145e-01	-0.747
RentedBikeCount_Lag5XHour19	-4.102e-01	1.237e-01	-3.315
RentedBikeCount_Lag5XHour20	1.268e-01	8.473e-02	1.496
RentedBikeCount_Lag6XHour2	-5.746e-02	5.856e-02	-0.981
RentedBikeCount_Lag6XHour4	-1.412e-02	4.751e-02	-0.297
RentedBikeCount_Lag6XHour9	3.252e-01	1.708e-01	1.905
RentedBikeCount_Lag6XHour10	5.339e-01	2.601e-01	2.053
RentedBikeCount_Lag6XHour16	7.445e-02	1.116e-01	0.667
RentedBikeCount_Lag6XHour18	-7.257e-01	3.674e-02	-19.755
RentedBikeCount_Lag6XHour19	5.920e-01	1.318e-01	4.491
RentedBikeCount_Lag6XHour20	1.740e-02	5.566e-02	0.313
RentedBikeCount_Lag6XHour22	2.673e-02	6.559e-02	0.408
RentedBikeCount_Lag6XHour23	1.874e-01	5.277e-02	3.552
RentedBikeCount_Lag7XHour1	8.443e-02	1.906e-02	4.430
RentedBikeCount_Lag7XHour8	9.596e-02	3.916e-02	2.451
RentedBikeCount_Lag7XHour16	-3.100e-03	1.083e-01	-0.029
RentedBikeCount_Lag7XHour19	-3.143e-01	9.176e-02	-3.425
RentedBikeCount_Lag7XHour21	1.020e-01	8.668e-02	1.177
RentedBikeCount_Lag7XHour22	-7.381e-02	8.788e-02	-0.840
RentedBikeCount_Lag7XHour23	-2.064e-01	8.407e-02	-2.455
RentedBikeCount_Lag8XHour4	4.093e-02	3.692e-02	1.108
RentedBikeCount_Lag8XHour5	-1.305e-02	5.871e-02	-0.222
RentedBikeCount_Lag8XHour6	-6.236e-02	7.309e-02	-0.853
RentedBikeCount_Lag8XHour10	9.384e-03	1.109e-01	0.085
RentedBikeCount_Lag8XHour16	4.276e-02	3.609e-02	1.185
RentedBikeCount_Lag8XHour17	-3.456e-02	8.011e-02	-0.431
RentedBikeCount_Lag8XHour21	2.261e-02	7.851e-02	0.288
RentedBikeCount_Lag8XHour22	9.770e-02	1.220e-01	0.800
RentedBikeCount_Lag8XHour23	1.370e-01	6.308e-02	2.172
RentedBikeCount_Lag9XHour5	3.172e-02	5.426e-02	0.585
RentedBikeCount_Lag9XHour6	5.720e-02	6.346e-02	0.901
RentedBikeCount_Lag9XHour7	3.351e-03	1.817e-02	0.184
RentedBikeCount_Lag9XHour8	-4.463e-02	2.842e-02	-1.570
RentedBikeCount_Lag9XHour10	-2.607e-02	7.621e-02	-0.342

RentedBikeCount_Lag9XHour13	3.305e-02	1.378e-01	0.240
RentedBikeCount_Lag9XHour17	1.277e-01	3.504e-02	3.644
RentedBikeCount_Lag9XHour18	1.045e+00	3.642e-02	28.688
RentedBikeCount_Lag9XHour19	3.783e-02	7.645e-02	0.495
RentedBikeCount_Lag9XHour22	-3.593e-04	8.791e-02	-0.004
TemperatureXIIsWinter	-1.299e+00	1.713e+00	-0.758
TemperatureXIIsSummer	-2.936e+00	1.528e+00	-1.921
TemperatureXIIsAutumn	-2.494e+00	6.712e-01	-3.715
WindSpeedXIIsSummer	2.260e+01	9.869e+00	2.290
VisibilityXIIsAutumn	6.547e-01	5.750e+00	0.114
DewPointTempXIIsWinter	-1.912e-01	1.116e+00	-0.171
DewPointTempXIIsSummer	-1.965e+00	1.155e+00	-1.701
SolarRadiationXIIsWinter	-2.929e+01	1.156e+01	-2.535
SolarRadiationXIIsSummer	-1.716e+01	9.566e+00	-1.793
RainfallXIIsWinter	-2.019e+00	1.018e+01	-0.198
RainfallXIIsSummer	-7.667e+00	4.336e+00	-1.768
RainfallXIIsAutumn	-1.310e+00	4.828e+00	-0.271
IsHolidayXIIsSummer	1.407e+01	2.726e+01	0.516
IsHolidayXIIsAutumn	1.279e+00	1.795e+01	0.071
Hour1XIIsWinter	3.052e+01	2.728e+01	1.119
Hour1XIIsAutumn	-5.050e+01	1.873e+01	-2.696
Hour2XIIsWinter	-1.769e+01	2.710e+01	-0.653
Hour2XIIsAutumn	-7.404e+01	2.100e+01	-3.526
Hour3XIIsWinter	1.693e+01	2.856e+01	0.593
Hour3XIIsSummer	-3.838e+01	2.645e+01	-1.451
Hour3XIIsAutumn	-7.198e+01	2.159e+01	-3.334
Hour4XIIsWinter	8.172e+00	2.698e+01	0.303
Hour4XIIsAutumn	-5.209e+01	1.953e+01	-2.668
Hour5XIIsWinter	1.433e+01	2.668e+01	0.537
Hour5XIIsAutumn	-8.104e+01	1.977e+01	-4.099
Hour6XIIsWinter	-1.570e+01	2.796e+01	-0.562
Hour6XIIsSummer	-5.694e+01	2.739e+01	-2.079
Hour6XIIsAutumn	-6.133e+01	2.158e+01	-2.843
Hour7XIIsWinter	-1.178e+02	2.808e+01	-4.197
Hour7XIIsSummer	-1.428e+02	2.757e+01	-5.179
Hour7XIIsAutumn	-1.370e+02	2.255e+01	-6.075
Hour8XIIsWinter	-8.344e+01	2.818e+01	-2.961
Hour8XIIsSummer	2.417e+01	2.809e+01	0.861
Hour8XIIsAutumn	-7.329e+01	2.227e+01	-3.291
Hour9XIIsWinter	-7.402e+01	2.849e+01	-2.598
Hour9XIIsSummer	-7.269e+01	2.968e+01	-2.449
Hour9XIIsAutumn	-9.435e+01	2.180e+01	-4.327
Hour10XIIsWinter	-2.915e+01	2.821e+01	-1.033

Hour10XIIsSummer	-5.723e+01	3.152e+01	-1.816
Hour10XIIsAutumn	-6.552e+01	2.057e+01	-3.185
Hour11XIIsWinter	4.617e+00	2.869e+01	0.161
Hour11XIIsSummer	-6.573e+01	3.227e+01	-2.037
Hour11XIIsAutumn	-8.871e+01	2.032e+01	-4.366
Hour12XIIsSummer	-7.715e+01	3.281e+01	-2.351
Hour12XIIsAutumn	-9.018e+01	1.970e+01	-4.578
Hour13XIIsWinter	3.496e+01	2.841e+01	1.231
Hour13XIIsSummer	-4.062e+01	3.432e+01	-1.184
Hour13XIIsAutumn	-1.630e+01	2.011e+01	-0.811
Hour14XIIsSummer	2.212e+01	2.893e+01	0.764
Hour15XIIsWinter	2.682e+01	2.713e+01	0.989
Hour15XIIsSummer	7.810e+01	2.785e+01	2.804
Hour16XIIsSummer	-7.174e+01	2.689e+01	-2.668
Hour16XIIsAutumn	-9.989e+01	2.023e+01	-4.937
Hour17XIIsWinter	4.868e+01	2.848e+01	1.709
Hour17XIIsSummer	1.548e+01	3.001e+01	0.516
Hour17XIIsAutumn	-6.784e+00	2.222e+01	-0.305
Hour18XIIsSummer	-1.860e+02	2.677e+01	-6.950
Hour18XIIsAutumn	-1.383e+02	2.140e+01	-6.461
Hour19XIIsSummer	1.475e+02	2.803e+01	5.261
Hour19XIIsAutumn	6.217e+01	2.174e+01	2.860
Hour20XIIsWinter	1.750e+01	2.704e+01	0.647
Hour20XIIsSummer	1.034e+02	2.625e+01	3.938
Hour21XIIsWinter	6.307e-01	2.849e+01	0.022
Hour21XIIsSummer	2.329e+01	2.837e+01	0.821
Hour21XIIsAutumn	-7.581e+01	1.928e+01	-3.933
Hour22XIIsSummer	5.622e+01	2.853e+01	1.971
Hour22XIIsAutumn	-1.624e+01	1.861e+01	-0.873
Hour23XIIsWinter	2.947e+01	2.720e+01	1.083
Hour23XIIsSummer	1.386e+01	2.934e+01	0.472
Hour23XIIsAutumn	-2.610e+01	1.871e+01	-1.396
RentedBikeCount_Lag1XIIsAutumn	2.161e-02	7.939e-03	2.723
RentedBikeCount_Lag3XIIsWinter	6.873e-03	2.931e-02	0.235
RentedBikeCount_Lag5XIIsSummer	1.314e-02	1.524e-02	0.862
RentedBikeCount_Lag6XIIsSummer	-8.995e-03	1.536e-02	-0.586
RentedBikeCount_Lag6XIIsAutumn	-5.114e-02	1.017e-02	-5.030
RentedBikeCount_Lag8XIIsAutumn	4.297e-02	9.528e-03	4.510
RentedBikeCount_Lag9XIIsWinter	-3.201e-02	2.687e-02	-1.191
Temperature	4.720e+00	3.254e+00	1.451
WindSpeed	-7.595e+00	8.989e+00	-0.845
DewPointTemp	7.229e+00	4.110e+00	1.759
Snowfall	1.804e+01	2.750e+01	0.656

IsHoliday	-3.454e+01	4.351e+01	-0.794
IsWinter	2.659e+01	1.818e+01	1.462
IsSummer	1.101e+02	3.091e+01	3.563
RentedBikeCount_Lag2	-2.392e-01	3.062e-02	-7.813
RentedBikeCount_Lag3	-6.991e-02	3.398e-02	-2.058
RentedBikeCount_Lag4	-8.695e-03	3.137e-02	-0.277
RentedBikeCount_Lag5	-9.410e-02	2.535e-02	-3.711
RentedBikeCount_Lag7	7.322e-02	3.963e-02	1.847
Humidity2	2.087e+01	6.509e+01	0.321
Humidity3	1.598e+01	5.858e+01	0.273
Humidity4	-5.389e+00	5.683e+01	-0.095
Humidity5	-9.759e+00	5.688e+01	-0.172
Humidity6	-1.896e+01	5.828e+01	-0.325
Humidity7	-2.998e+01	6.059e+01	-0.495
Humidity8	-3.442e+01	6.390e+01	-0.539
Humidity9	-2.830e+01	6.764e+01	-0.418
Humidity10	-2.795e+01	7.198e+01	-0.388
ExtremeWind	-9.540e+00	6.967e+00	-1.369
Pr(> t )			
(Intercept)	0.006178	**	
Humidity	0.049695	*	
Visibility	0.183781		
SolarRadiation	0.028846	*	
Rainfall	0.031445	*	
Hour1	0.014182	*	
Hour2	0.279089		
Hour3	0.001150	**	
Hour4	0.039068	*	
Hour5	2.62e-09	***	
Hour6	6.28e-10	***	
Hour7	0.039379	*	
Hour8	0.528752		
Hour9	0.970308		
Hour10	7.46e-07	***	
Hour11	0.207401		
Hour12	0.252971		
Hour13	4.42e-11	***	
Hour14	0.782764		
Hour15	1.19e-06	***	
Hour16	8.62e-08	***	
Hour17	0.000466	***	
Hour18	2.86e-09	***	
Hour19	0.065940	.	

Hour20	0.974012
Hour21	0.100341
Hour22	0.513055
Hour23	5.80e-08 ***
IsAutumn	0.039181 *
RentedBikeCount_Lag1	< 2e-16 ***
RentedBikeCount_Lag6	0.552318
RentedBikeCount_Lag8	0.522112
RentedBikeCount_Lag9	0.036472 *
HumidityXVisibility	0.040098 *
HumidityXSolarRadiation	0.000984 ***
HumidityXIsholiday	0.421556
HumidityXRentedBikeCount_Lag1	0.022036 *
HumidityXRentedBikeCount_Lag6	0.062327 .
HumidityXRentedBikeCount_Lag9	0.000186 ***
TemperatureXDewPointTemp	0.007680 **
TemperatureXSolarRadiation	0.210305
TemperatureXRentedBikeCount_Lag1	0.006422 **
TemperatureXRentedBikeCount_Lag2	0.293327
TemperatureXRentedBikeCount_Lag3	0.336041
WindSpeedXDewPointTemp	0.769772
WindSpeedXSolarRadiation	0.563372
WindSpeedXRainfall	0.734918
WindSpeedXSnowfall	0.650667
WindSpeedXIsholiday	0.225254
WindSpeedXRentedBikeCount_Lag1	0.863700
VisibilityXDewPointTemp	0.376724
VisibilityXRainfall	0.628632
VisibilityXSnowfall	0.315683
VisibilityXRentedBikeCount_Lag7	0.054440 .
DewPointTempXSolarRadiation	0.014425 *
DewPointTempXRainfall	0.298843
DewPointTempXSnowfall	0.504143
DewPointTempXIsholiday	0.812690
DewPointTempXRentedBikeCount_Lag3	0.722861
SolarRadiationXRainfall	0.002543 **
SolarRadiationXIsholiday	0.029412 *
SolarRadiationXRentedBikeCount_Lag1	0.184028
SolarRadiationXRentedBikeCount_Lag2	0.516824
SolarRadiationXRentedBikeCount_Lag4	0.241542
SolarRadiationXRentedBikeCount_Lag5	0.071285 .
SolarRadiationXRentedBikeCount_Lag9	5.29e-05 ***
RainfallXSnowfall	0.813918

RainfallXIsHoliday	0.344602
RainfallXRentedBikeCount_Lag1	8.14e-10 ***
RainfallXRentedBikeCount_Lag2	0.957506
RainfallXRentedBikeCount_Lag4	0.024739 *
RainfallXRentedBikeCount_Lag8	0.268501
SnowfallXIsHoliday	0.931813
SnowfallXRentedBikeCount_Lag2	0.624467
SnowfallXRentedBikeCount_Lag9	0.673001
IsHolidayXRentedBikeCount_Lag4	0.482062
RentedBikeCount_Lag1XRentedBikeCount_Lag2	< 2e-16 ***
RentedBikeCount_Lag1XRentedBikeCount_Lag7	0.058773 .
RentedBikeCount_Lag1XRentedBikeCount_Lag8	0.004052 **
RentedBikeCount_Lag1XRentedBikeCount_Lag9	0.266475
RentedBikeCount_Lag2XRentedBikeCount_Lag3	0.000271 ***
RentedBikeCount_Lag3XRentedBikeCount_Lag4	0.948995
RentedBikeCount_Lag3XRentedBikeCount_Lag5	0.052061 .
RentedBikeCount_Lag4XRentedBikeCount_Lag5	0.456012
RentedBikeCount_Lag4XRentedBikeCount_Lag9	0.559568
RentedBikeCount_Lag5XRentedBikeCount_Lag6	0.007330 **
RentedBikeCount_Lag5XRentedBikeCount_Lag9	0.981405
RentedBikeCount_Lag7XRentedBikeCount_Lag8	0.014040 *
HumidityXHour1	0.000224 ***
HumidityXHour2	0.006108 **
HumidityXHour3	3.68e-06 ***
HumidityXHour4	0.003652 **
HumidityXHour5	0.000182 ***
HumidityXHour6	7.96e-06 ***
HumidityXHour7	3.01e-07 ***
HumidityXHour8	0.216607
HumidityXHour9	0.239916
HumidityXHour10	0.006352 **
HumidityXHour11	0.638504
HumidityXHour12	0.539010
HumidityXHour13	0.001489 **
HumidityXHour14	0.434744
HumidityXHour15	0.708743
HumidityXHour16	0.762648
HumidityXHour17	0.005578 **
HumidityXHour18	0.081144 .
HumidityXHour19	0.395494
HumidityXHour20	0.180231
HumidityXHour21	0.005645 **
HumidityXHour22	0.054129 .

HumidityXHour23	0.103013
TemperatureXHour1	6.44e-15 ***
TemperatureXHour2	7.97e-15 ***
TemperatureXHour4	5.74e-10 ***
TemperatureXHour5	4.32e-07 ***
TemperatureXHour6	5.47e-06 ***
TemperatureXHour7	< 2e-16 ***
TemperatureXHour8	8.64e-16 ***
TemperatureXHour9	1.65e-10 ***
TemperatureXHour10	8.44e-10 ***
TemperatureXHour11	0.000173 ***
TemperatureXHour12	2.60e-06 ***
TemperatureXHour14	2.41e-09 ***
TemperatureXHour15	8.60e-06 ***
TemperatureXHour17	0.000579 ***
TemperatureXHour18	0.401030
TemperatureXHour19	1.71e-14 ***
TemperatureXHour20	2.51e-07 ***
TemperatureXHour21	9.62e-08 ***
TemperatureXHour22	2.48e-12 ***
TemperatureXHour23	4.11e-06 ***
WindSpeedXHour1	0.438526
WindSpeedXHour2	0.875489
WindSpeedXHour3	0.742569
WindSpeedXHour4	0.641746
WindSpeedXHour5	0.910044
WindSpeedXHour6	0.616645
WindSpeedXHour7	0.745094
WindSpeedXHour9	0.933004
WindSpeedXHour10	0.798992
WindSpeedXHour11	0.442490
WindSpeedXHour12	0.248036
WindSpeedXHour13	0.505803
WindSpeedXHour14	0.636734
WindSpeedXHour15	0.273709
WindSpeedXHour19	0.737040
WindSpeedXHour20	0.436779
WindSpeedXHour21	0.187306
WindSpeedXHour22	0.769057
VisibilityXHour1	0.613047
VisibilityXHour2	0.075291 .
VisibilityXHour3	0.430325
VisibilityXHour4	0.337854

VisibilityXHour7	0.344476
VisibilityXHour8	0.067523 .
VisibilityXHour9	0.085409 .
VisibilityXHour11	0.871783
VisibilityXHour12	0.402314
VisibilityXHour14	0.141190
VisibilityXHour17	0.283895
VisibilityXHour19	0.404090
VisibilityXHour20	0.003166 **
VisibilityXHour21	0.580144
VisibilityXHour22	0.082640 .
DewPointTempXHour3	1.46e-08 ***
DewPointTempXHour13	0.000113 ***
SolarRadiationXHour6	0.570990
SolarRadiationXHour7	0.019262 *
SolarRadiationXHour8	1.64e-10 ***
SolarRadiationXHour9	0.702420
SolarRadiationXHour16	0.002692 **
SolarRadiationXHour17	0.268932
SolarRadiationXHour18	0.812991
SolarRadiationXHour19	< 2e-16 ***
Rainfall1XHour1	0.034314 *
Rainfall1XHour2	0.010808 *
Rainfall1XHour3	0.083901 .
Rainfall1XHour4	0.011293 *
Rainfall1XHour5	0.279582
Rainfall1XHour7	1.43e-06 ***
Rainfall1XHour8	0.029565 *
Rainfall1XHour9	0.089610 .
Rainfall1XHour10	0.052698 .
Rainfall1XHour11	0.010236 *
Rainfall1XHour12	0.128700
Rainfall1XHour13	0.010632 *
Rainfall1XHour14	0.050305 .
Rainfall1XHour15	0.000639 ***
Rainfall1XHour16	0.761140
Rainfall1XHour18	0.347054
Rainfall1XHour19	0.174936
Rainfall1XHour20	0.011576 *
Rainfall1XHour21	0.000286 ***
Rainfall1XHour22	0.797498
Rainfall1XHour23	0.029828 *
Snowfall1XHour1	0.793631

Snowfall1XHour3	0.836135
Snowfall1XHour4	0.856970
Snowfall1XHour6	0.882057
Snowfall1XHour9	0.519574
Snowfall1XHour11	0.229954
Snowfall1XHour12	0.355927
Snowfall1XHour13	0.810234
Snowfall1XHour14	0.752395
Snowfall1XHour16	0.103721
Snowfall1XHour17	0.967997
Snowfall1XHour18	0.119500
Snowfall1XHour20	0.819179
Snowfall1XHour21	0.853167
Snowfall1XHour22	0.909835
IsHolidayXHour1	0.196560
IsHolidayXHour2	0.095907 .
IsHolidayXHour3	0.418163
IsHolidayXHour4	0.883757
IsHolidayXHour5	0.629200
IsHolidayXHour6	0.852514
IsHolidayXHour7	0.542980
IsHolidayXHour8	0.387393
IsHolidayXHour10	0.838131
IsHolidayXHour11	0.600499
IsHolidayXHour12	0.580445
IsHolidayXHour13	0.454459
IsHolidayXHour14	0.232601
IsHolidayXHour15	0.074624 .
IsHolidayXHour16	0.712470
IsHolidayXHour17	0.652270
IsHolidayXHour18	0.054078 .
IsHolidayXHour19	0.002691 **
IsHolidayXHour20	0.091086 .
IsHolidayXHour21	0.446081
IsHolidayXHour22	0.445854
IsHolidayXHour23	0.748322
RentedBikeCount_Lag1XHour3	0.004306 **
RentedBikeCount_Lag1XHour6	< 2e-16 ***
RentedBikeCount_Lag1XHour7	< 2e-16 ***
RentedBikeCount_Lag1XHour8	< 2e-16 ***
RentedBikeCount_Lag1XHour9	< 2e-16 ***
RentedBikeCount_Lag1XHour10	5.06e-09 ***
RentedBikeCount_Lag1XHour12	0.002238 **

RentedBikeCount_Lag1XHour13	3.54e-06 ***
RentedBikeCount_Lag1XHour14	< 2e-16 ***
RentedBikeCount_Lag1XHour15	< 2e-16 ***
RentedBikeCount_Lag1XHour16	7.09e-07 ***
RentedBikeCount_Lag1XHour17	2.09e-09 ***
RentedBikeCount_Lag1XHour18	< 2e-16 ***
RentedBikeCount_Lag1XHour20	< 2e-16 ***
RentedBikeCount_Lag1XHour21	1.64e-10 ***
RentedBikeCount_Lag1XHour23	0.000135 ***
RentedBikeCount_Lag2XHour1	0.000169 ***
RentedBikeCount_Lag2XHour2	0.000611 ***
RentedBikeCount_Lag2XHour3	0.004498 **
RentedBikeCount_Lag2XHour4	0.791909
RentedBikeCount_Lag2XHour6	1.65e-09 ***
RentedBikeCount_Lag2XHour11	< 2e-16 ***
RentedBikeCount_Lag2XHour12	0.013279 *
RentedBikeCount_Lag2XHour16	0.011116 *
RentedBikeCount_Lag2XHour17	0.046830 *
RentedBikeCount_Lag2XHour22	0.173030
RentedBikeCount_Lag3XHour1	0.302149
RentedBikeCount_Lag3XHour2	0.522363
RentedBikeCount_Lag3XHour3	0.233892
RentedBikeCount_Lag3XHour4	0.194247
RentedBikeCount_Lag3XHour12	0.554448
RentedBikeCount_Lag3XHour13	0.001815 **
RentedBikeCount_Lag3Xhour14	0.559446
RentedBikeCount_Lag3XHour16	0.190244
RentedBikeCount_Lag3XHour17	0.230101
RentedBikeCount_Lag3XHour19	0.060927 .
RentedBikeCount_Lag3XHour20	2.67e-06 ***
RentedBikeCount_Lag3XHour21	8.29e-09 ***
RentedBikeCount_Lag3XHour22	0.001687 **
RentedBikeCount_Lag4Xhour2	0.850836
RentedBikeCount_Lag4Xhour3	0.724966
RentedBikeCount_Lag4Xhour11	0.047029 *
RentedBikeCount_Lag4Xhour14	0.607233
RentedBikeCount_Lag4Xhour16	0.928218
RentedBikeCount_Lag4Xhour17	0.256455
RentedBikeCount_Lag4Xhour19	5.24e-05 ***
RentedBikeCount_Lag4Xhour20	0.002814 **
RentedBikeCount_Lag4Xhour21	0.418811
RentedBikeCount_Lag4Xhour22	0.368765
RentedBikeCount_Lag5Xhour2	0.156168

RentedBikeCount_Lag5XHour3	0.249417
RentedBikeCount_Lag5XHour5	0.000395 ***
RentedBikeCount_Lag5XHour9	0.000805 ***
RentedBikeCount_Lag5XHour10	0.454880
RentedBikeCount_Lag5XHour19	0.000922 ***
RentedBikeCount_Lag5XHour20	0.134562
RentedBikeCount_Lag6XHour2	0.326595
RentedBikeCount_Lag6XHour4	0.766278
RentedBikeCount_Lag6XHour9	0.056851 .
RentedBikeCount_Lag6XHour10	0.040091 *
RentedBikeCount_Lag6XHour16	0.504563
RentedBikeCount_Lag6XHour18	< 2e-16 ***
RentedBikeCount_Lag6XHour19	7.20e-06 ***
RentedBikeCount_Lag6XHour20	0.754628
RentedBikeCount_Lag6XHour22	0.683615
RentedBikeCount_Lag6XHour23	0.000385 ***
RentedBikeCount_Lag7XHour1	9.57e-06 ***
RentedBikeCount_Lag7XHour8	0.014277 *
RentedBikeCount_Lag7XHour16	0.977173
RentedBikeCount_Lag7XHour19	0.000618 ***
RentedBikeCount_Lag7XHour21	0.239346
RentedBikeCount_Lag7XHour22	0.400979
RentedBikeCount_Lag7XHour23	0.014102 *
RentedBikeCount_Lag8XHour4	0.267686
RentedBikeCount_Lag8XHour5	0.824122
RentedBikeCount_Lag8XHour6	0.393602
RentedBikeCount_Lag8XHour10	0.932561
RentedBikeCount_Lag8XHour16	0.236084
RentedBikeCount_Lag8XHour17	0.666214
RentedBikeCount_Lag8XHour21	0.773401
RentedBikeCount_Lag8XHour22	0.423457
RentedBikeCount_Lag8XHour23	0.029864 *
RentedBikeCount_Lag9XHour5	0.558760
RentedBikeCount_Lag9XHour6	0.367436
RentedBikeCount_Lag9XHour7	0.853650
RentedBikeCount_Lag9XHour8	0.116387
RentedBikeCount_Lag9XHour10	0.732244
RentedBikeCount_Lag9XHour13	0.810466
RentedBikeCount_Lag9XHour17	0.000271 ***
RentedBikeCount_Lag9XHour18	< 2e-16 ***
RentedBikeCount_Lag9XHour19	0.620700
RentedBikeCount_Lag9XHour22	0.996739
TemperatureXIsWinter	0.448385

TemperatureXIIsSummer	0.054813 .
TemperatureXIIsAutumn	0.000204 ***
WindSpeedXIIsSummer	0.022022 *
VisibilityXIIsAutumn	0.909349
DewPointTempXIIsWinter	0.863902
DewPointTempXIIsSummer	0.088974 .
SolarRadiationXIIsWinter	0.011271 *
SolarRadiationXIIsSummer	0.072935 .
RainfallXIIsWinter	0.842772
RainfallXIIsSummer	0.077091 .
RainfallXIIsAutumn	0.786184
IsHolidayXIIsSummer	0.605722
IsHolidayXIIsAutumn	0.943204
Hour1XIIsWinter	0.263205
Hour1XIIsAutumn	0.007039 **
Hour2XIIsWinter	0.513883
Hour2XIIsAutumn	0.000424 ***
Hour3XIIsWinter	0.553224
Hour3XIIsSummer	0.146817
Hour3XIIsAutumn	0.000861 ***
Hour4XIIsWinter	0.761992
Hour4XIIsAutumn	0.007651 **
Hour5XIIsWinter	0.591162
Hour5XIIsAutumn	4.20e-05 ***
Hour6XIIsWinter	0.574377
Hour6XIIsSummer	0.037636 *
Hour6XIIsAutumn	0.004487 **
Hour7XIIsWinter	2.74e-05 ***
Hour7XIIsSummer	2.28e-07 ***
Hour7XIIsAutumn	1.30e-09 ***
Hour8XIIsWinter	0.003074 **
Hour8XIIsSummer	0.389475
Hour8XIIsAutumn	0.001003 **
Hour9XIIsWinter	0.009405 **
Hour9XIIsSummer	0.014333 *
Hour9XIIsAutumn	1.53e-05 ***
Hour10XIIsWinter	0.301510
Hour10XIIsSummer	0.069479 .
Hour10XIIsAutumn	0.001451 **
Hour11XIIsWinter	0.872169
Hour11XIIsSummer	0.041709 *
Hour11XIIsAutumn	1.28e-05 ***
Hour12XIIsSummer	0.018742 *

Hour12XIIsAutumn	4.76e-06 ***
Hour13XIIsWinter	0.218542
Hour13XIIsSummer	0.236612
Hour13XIIsAutumn	0.417673
Hour14XIIsSummer	0.444595
Hour15XIIsWinter	0.322899
Hour15XIIsSummer	0.005052 **
Hour16XIIsSummer	0.007653 **
Hour16XIIsAutumn	8.08e-07 ***
Hour17XIIsWinter	0.087402 .
Hour17XIIsSummer	0.605984
Hour17XIIsAutumn	0.760123
Hour18XIIsSummer	3.94e-12 ***
Hour18XIIsAutumn	1.10e-10 ***
Hour19XIIsSummer	1.47e-07 ***
Hour19XIIsAutumn	0.004244 **
Hour20XIIsWinter	0.517552
Hour20XIIsSummer	8.30e-05 ***
Hour21XIIsWinter	0.982338
Hour21XIIsSummer	0.411639
Hour21XIIsAutumn	8.47e-05 ***
Hour22XIIsSummer	0.048772 *
Hour22XIIsAutumn	0.382767
Hour23XIIsWinter	0.278717
Hour23XIIsSummer	0.636785
Hour23XIIsAutumn	0.162893
RentedBikeCount_Lag1XIIsAutumn	0.006488 **
RentedBikeCount_Lag3XIIsWinter	0.814572
RentedBikeCount_Lag5XIIsSummer	0.388488
RentedBikeCount_Lag6XIIsSummer	0.558201
RentedBikeCount_Lag6XIIsAutumn	5.02e-07 ***
RentedBikeCount_Lag8XIIsAutumn	6.56e-06 ***
RentedBikeCount_Lag9XIIsWinter	0.233667
Temperature	0.146915
WindSpeed	0.398207
DewPointTemp	0.078634 .
Snowfall	0.511970
IsHoliday	0.427320
IsWinter	0.143685
IsSummer	0.000369 ***
RentedBikeCount_Lag2	6.29e-15 ***
RentedBikeCount_Lag3	0.039661 *
RentedBikeCount_Lag4	0.781684

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RentedBikeCount_Lag5          0.000207 ***
RentedBikeCount_Lag7          0.064715 .
Humidity2                     0.748472
Humidity3                     0.785032
Humidity4                     0.924457
Humidity5                     0.863772
Humidity6                     0.745013
Humidity7                     0.620783
Humidity8                     0.590168
Humidity9                     0.675712
Humidity10                    0.697794
ExtremeWind                   0.170915
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Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
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Residual standard error: 109.9 on 8328 degrees of freedom  
(9 observations deleted due to missingness)

Multiple R-squared: 0.9724, Adjusted R-squared: 0.971  
F-statistic: 694.3 on 422 and 8328 DF, p-value: < 2.2e-16