PSEI

Packages

Load the packages.

```
library(forecast)
```

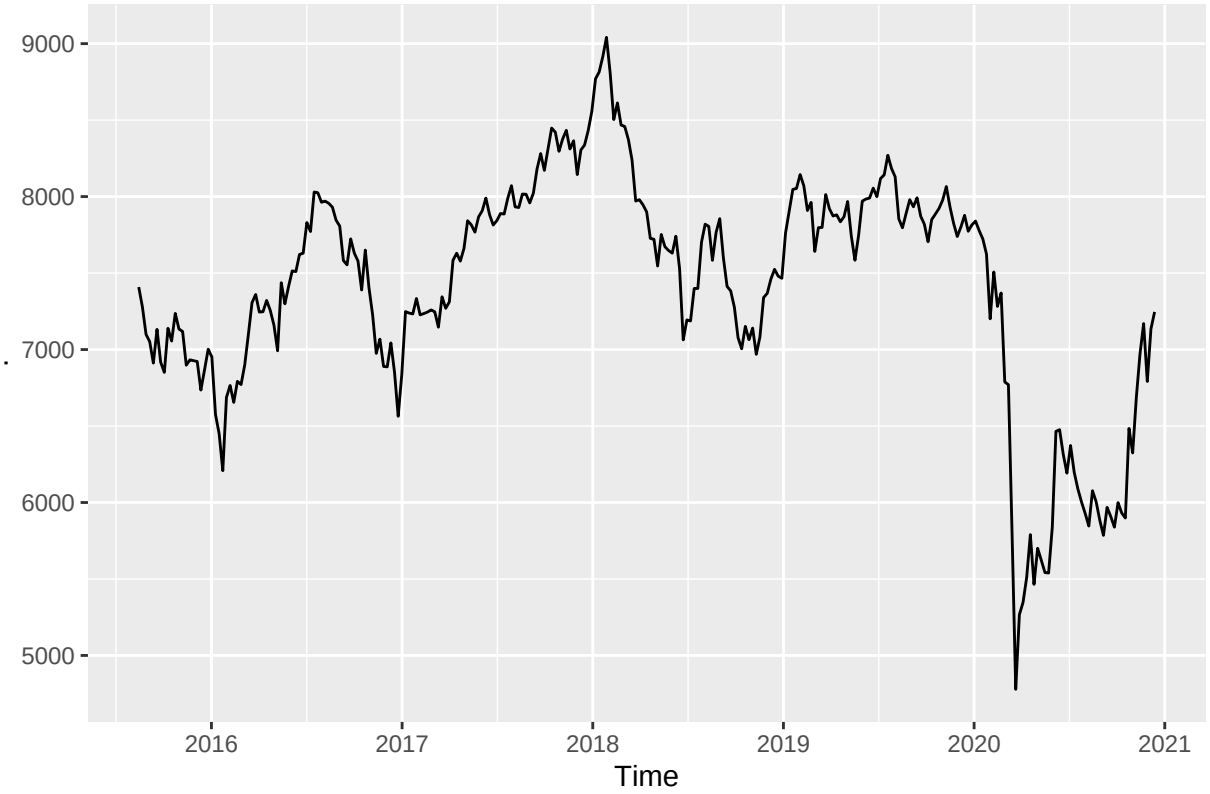
```
## Registered S3 method overwritten by 'quantmod':
##   method            from
##   as.zoo.data.frame zoo
```

```
library(ggplot2)
library(readr)
```

Viewing and Decomposing the Data

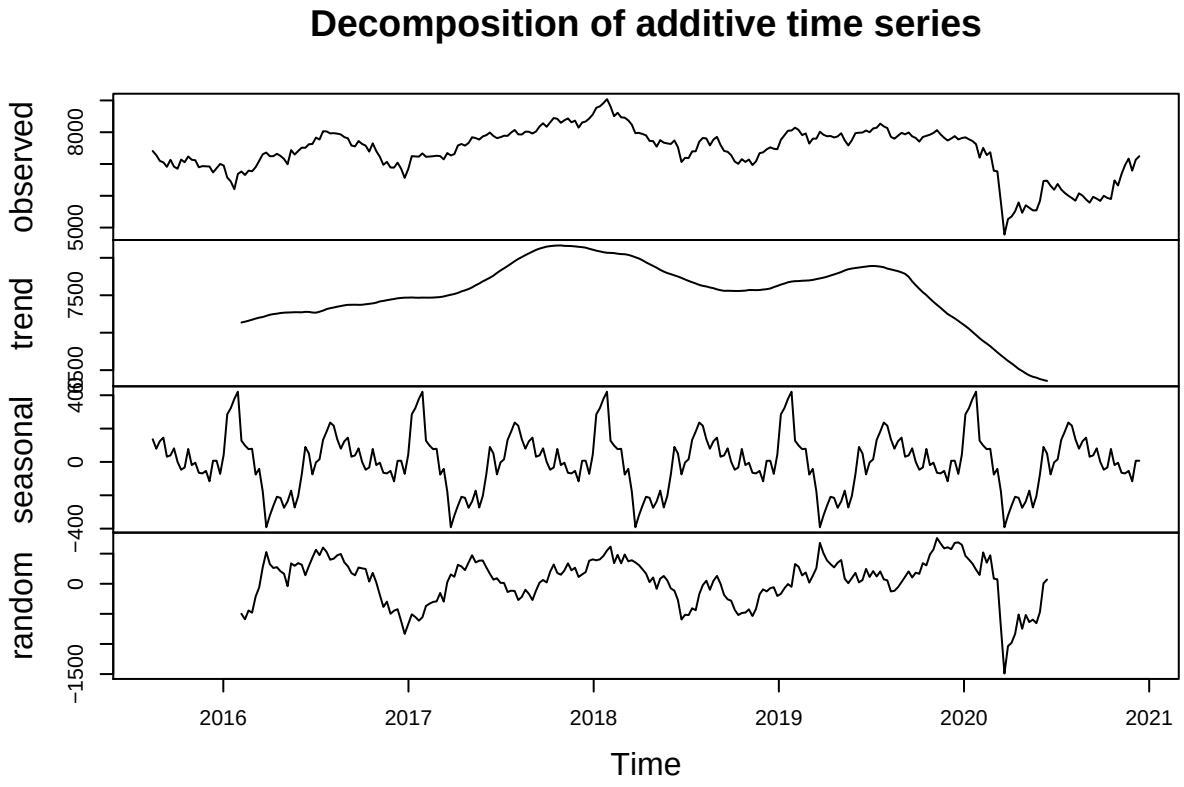
This commant will let us view the plot of the PSEI time series

```
PSEI <- read_csv("~/R/SPP/CSV/PSEI.csv", col_types = cols(Week = col_date(format = "%Y-%m-%d")))
psei <- ts(PSEI[,2], freq=365.25/7, start=2015+226/365.25)
psei %>%
  autoplot()
```



This will show the trend, seasonal, and random component of the time series.

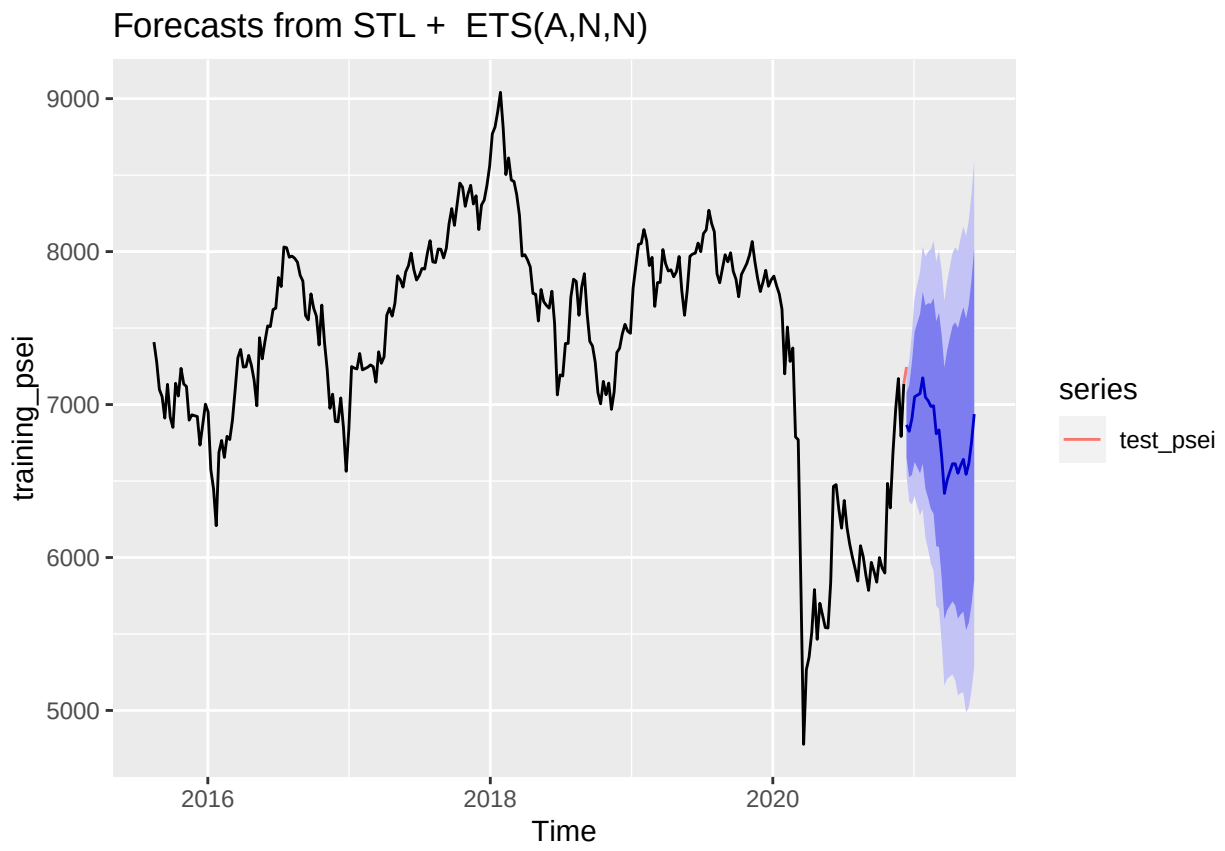
```
plot(decompose(psei))
```



Forecasting

This is a validation of last week's forecast.

```
training_psei <- subset(psei, end=length(psei)-1)
test_psei <- subset(psei, start=length(psei)-1)
fc_training_psei<-forecast(training_psei)
fc_training_psei %>%
  forecast(h=26) %>%
  autoplot() +autolayer(test_psei)
```



These are the point forecast, the 80% and the 95% confidence interval.

```
fc_training_psei
```

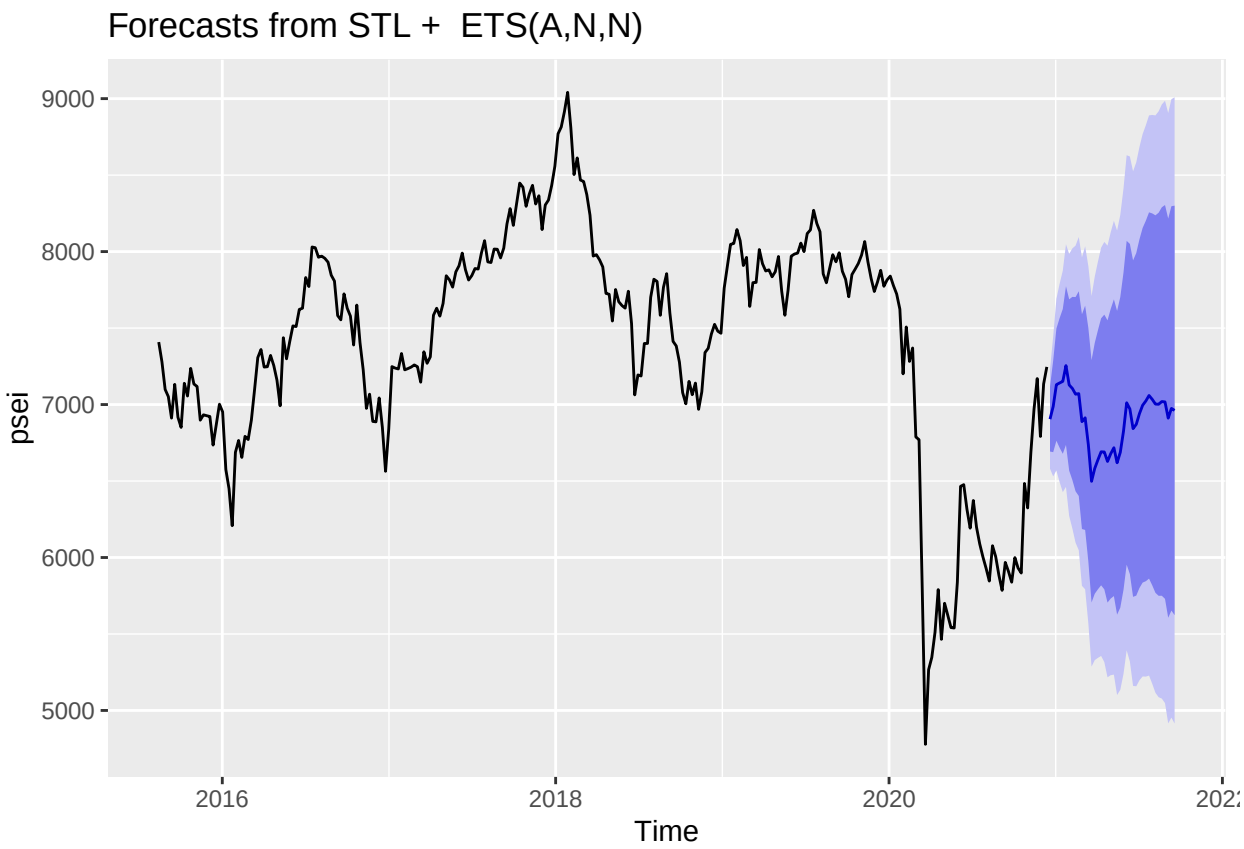
```
##          Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
## 2020.947       6867.335 6654.971 7079.698 6542.553 7192.117
## 2020.966       6824.983 6524.696 7125.270 6365.733 7284.232
## 2020.985       6908.385 6540.627 7276.144 6345.947 7470.823
## 2021.004       7050.295 6625.654 7474.937 6400.863 7699.728
## 2021.023       7061.336 6586.579 7536.093 6335.258 7787.415
## 2021.042       7071.576 6551.510 7591.642 6276.204 7866.948
## 2021.062       7174.837 6613.105 7736.568 6315.742 8033.931
## 2021.081       7048.126 6447.613 7648.640 6129.720 7966.532
## 2021.100       7025.440 6388.502 7662.378 6051.327 7999.553
## 2021.119       6988.068 6316.678 7659.457 5961.266 8014.870
## 2021.138       6991.846 6287.688 7696.004 5914.929 8068.762
## 2021.157       6808.915 6073.448 7544.383 5684.115 7933.716
## 2021.177       6834.216 6068.719 7599.714 5663.489 8004.944
## 2021.196       6658.535 5864.142 7452.928 5443.616 7873.454
## 2021.215       6419.318 5597.044 7241.591 5161.758 7676.877
## 2021.234       6504.192 5654.952 7353.432 5205.392 7802.992
## 2021.253       6560.427 5685.051 7435.802 5221.655 7899.198
## 2021.272       6612.998 5712.245 7513.752 5235.415 7990.581
## 2021.292       6612.408 5686.972 7537.843 5197.077 8027.739
## 2021.311       6550.949 5601.473 7500.424 5098.851 8003.047
## 2021.330       6601.669 5628.746 7574.591 5113.712 8089.625
## 2021.349       6641.680 5645.862 7637.497 5118.708 8164.651
```

```
## 2021.368       6543.962 5525.765 7562.160 4986.763  8101.161
## 2021.387       6612.562 5572.466 7652.658 5021.872  8203.252
## 2021.407       6750.853 5689.310 7812.396 5127.363  8374.343
## 2021.426       6937.724 5855.158 8020.289 5282.082  8593.365
## 2021.445       6897.703 5794.515 8000.890 5210.523  8584.882
## 2021.464       6769.564 5646.133 7892.994 5051.425  8487.703
## 2021.483       6798.292 5654.976 7941.607 5049.741  8546.842
## 2021.502       6868.806 5705.946 8031.667 5090.365  8647.248
## 2021.522       6923.826 5741.743 8105.908 5115.987  8731.664
## 2021.541       6952.651 5751.655 8153.647 5115.885  8789.416
## 2021.560       6988.969 5769.352 8208.587 5123.726  8854.213
## 2021.579       6964.062 5726.104 8202.020 5070.768  8857.355
## 2021.598       6932.910 5676.879 8188.941 5011.976  8853.844
## 2021.617       6932.139 5658.291 8205.987 4983.957  8880.321
## 2021.637       6950.504 5659.085 8241.923 4975.449  8925.558
## 2021.656       6948.396 5639.642 8257.150 4946.830  8949.962
## 2021.675       6842.778 5516.916 8168.640 4815.047  8870.509
## 2021.694       6907.148 5564.396 8249.901 4853.586  8960.711
## 2021.713       6894.568 5535.135 8254.002 4815.495  8973.642
## 2021.732       6817.533 5441.622 8193.444 4713.258  8921.808
## 2021.752       6837.272 5445.077 8229.466 4708.093  8966.450
## 2021.771       6837.927 5429.637 8246.217 4684.134  8991.721
## 2021.790       6922.484 5498.281 8346.687 4744.354  9100.615
## 2021.809       6976.489 5536.549 8416.430 4774.291  9178.688
## 2021.828       6966.282 5510.774 8421.790 4740.275  9192.289
## 2021.847       6989.087 5518.177 8459.997 4739.525  9238.650
## 2021.867       7047.440 5561.287 8533.592 4774.565  9320.314
## 2021.886       7111.270 5610.029 8612.510 4815.320  9407.219
## 2021.905       6991.831 5475.652 8508.010 4673.036  9310.627
## 2021.924       7134.506 5603.535 8665.477 4793.088  9475.924
## 2021.943       6867.335 5321.713 8412.957 4503.511  9231.159
## 2021.962       6824.983 5264.848 8385.117 4438.963  9211.003
## 2021.982       6908.385 5333.871 8482.899 4500.374  9316.397
## 2022.001       7050.295 5461.532 8639.059 4620.492  9480.099
## 2022.020       7061.336 5458.451 8664.222 4609.934  9512.738
## 2022.039       7071.576 5454.691 8688.461 4598.764  9544.388
## 2022.058       7174.837 5544.073 8805.600 4680.799  9668.874
## 2022.077       7048.126 5403.601 8692.652 4533.042  9563.211
## 2022.097       7025.440 5367.267 8683.613 4489.483  9561.397
## 2022.116       6988.068 5316.358 8659.777 4431.409  9544.727
## 2022.135       6991.846 5306.709 8676.983 4414.651  9569.040
## 2022.154       6808.915 5110.457 8507.374 4211.348  9406.483
## 2022.173       6834.216 5122.540 8545.892 4216.434  9451.999
## 2022.192       6658.535 4933.743 8383.327 4020.693  9296.377
## 2022.211       6419.318 4681.508 8157.127 3761.567  9077.068
## 2022.231       6504.192 4753.462 8254.922 3826.681  9181.703
## 2022.250       6560.427 4796.870 8323.983 3863.300  9257.553
## 2022.269       6612.998 4836.709 8389.288 3896.398  9329.599
## 2022.288       6612.408 4823.476 8401.340 3876.472  9348.343
## 2022.307       6550.949 4749.463 8352.435 3795.813  9306.084
## 2022.326       6601.669 4787.715 8415.622 3827.466  9375.871
## 2022.346       6641.680 4815.344 8468.015 3848.541  9434.818
## 2022.365       6543.962 4705.328 8382.596 3732.015  9355.910
## 2022.384       6612.562 4761.711 8463.413 3781.930  9443.194
```

```
## 2022.403       6750.853 4887.866 8613.840 3901.660  9600.046
## 2022.422       6937.724 5062.678 8812.769 4070.089  9805.358
## 2022.441       6897.703 5010.676 8784.729 4011.744  9783.661
## 2022.461       6769.564 4870.631 8668.496 3865.397  9673.730
## 2022.480       6798.292 4887.528 8709.055 3876.031  9720.553
## 2022.499       6868.806 4946.284 8791.329 3928.562  9809.051
## 2022.518       6923.826 4989.616 8858.035 3965.707  9881.944
## 2022.537       6952.651 5006.825 8898.477 3976.766  9928.536
## 2022.556       6988.969 5031.595 8946.344 3995.424  9982.515
## 2022.576       6964.062 4995.207 8932.916 3952.958  9975.165
## 2022.595       6932.910 4952.642 8913.178 3904.351  9961.469
## 2022.614       6932.139 4940.523 8923.756 3886.225  9978.054
## 2022.633       6950.504 4947.603 8953.404 3887.332 10013.676
## 2022.652       6948.396 4934.275 8962.517 3868.063 10028.729
## 2022.671       6842.778 4817.498 8868.058 3745.380  9940.176
## 2022.691       6907.148 4870.771 8943.526 3792.778 10021.519
## 2022.710       6894.568 4847.154 8941.983 3763.318 10025.819
## 2022.729       6817.533 4759.140 8875.926 3669.493  9965.573
## 2022.748       6837.272 4767.959 8906.584 3672.531 10002.012
## 2022.767       6837.927 4757.752 8918.102 3656.574 10019.280
## 2022.786       6922.484 4831.503 9013.466 3724.605 10120.364
## 2022.806       6976.489 4874.758 9078.221 3762.168 10190.811
## 2022.825       6966.282 4853.854 9078.710 3735.603 10196.961
## 2022.844       6989.087 4866.018 9112.157 3742.133 10236.042
## 2022.863       7047.440 4913.781 9181.098 3784.291 10310.589
## 2022.882       7111.270 4967.075 9255.465 3832.006 10390.533
## 2022.901       6991.831 4837.151 9146.511 3696.532 10287.130
## 2022.921       7134.506 4969.392 9299.620 3823.249 10445.763
```

This is next week's forecast.

```
fc_psei<-forecast(psei)
fc_psei %>%
  forecast(h=40) %>%
  autoplot()
```



These are the point forecast, the 80% and the 95% confidence interval.

```
fc_psei
```

```
##          Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
## 2020.966       6904.550 6692.890 7116.210 6580.843 7228.256
## 2020.985       6988.009 6688.692 7287.327 6530.243 7445.776
## 2021.004       7129.978 6763.397 7496.559 6569.340 7690.615
## 2021.023       7141.077 6717.789 7564.365 6493.714 7788.440
## 2021.042       7151.376 6678.128 7624.624 6427.606 7875.146
## 2021.062       7254.695 6736.280 7773.111 6461.848 8047.543
## 2021.081       7128.045 6568.093 7687.996 6271.673 7984.416
## 2021.100       7105.418 6506.806 7704.030 6189.920 8020.916
## 2021.119       7067.822 6432.899 7702.745 6096.791 8038.853
## 2021.138       7071.376 6402.109 7740.643 6047.821 8094.931
## 2021.157       6888.222 6186.289 7590.154 5814.709 7961.734
## 2021.177       6913.297 6180.154 7646.441 5792.051 8034.544
## 2021.196       6737.391 5974.311 7500.471 5570.361 7904.421
## 2021.215       6497.947 5706.062 7289.832 5286.864 7709.030
## 2021.234       6582.596 5762.917 7402.274 5329.006 7836.185
## 2021.253       6638.603 5792.043 7485.163 5343.902 7933.304
## 2021.272       6690.947 5818.334 7563.561 5356.400 8025.494
## 2021.292       6689.860 5791.949 7587.772 5316.623 8063.097
## 2021.311       6627.905 5705.389 7550.421 5217.039 8038.772
## 2021.330       6678.129 5731.648 7624.610 5230.611 8125.647
## 2021.349       6717.645 5747.790 7687.499 5234.380 8200.909
## 2021.368       6619.432 5626.754 7612.109 5101.263 8137.601
```

```
## 2021.387       6687.536 5672.549 7702.524 5135.247  8239.826
## 2021.407       6825.333 5788.515 7862.150 5239.657  8411.008
## 2021.426       7011.709 5953.512 8069.906 5393.336  8630.082
## 2021.445       6971.194 5892.041 8050.348 5320.772  8621.617
## 2021.464       6842.531 5742.821 7942.242 5160.669  8524.393
## 2021.483       6870.734 5750.844 7990.624 5158.010  8583.458
## 2021.502       6940.724 5801.011 8080.436 5197.684  8683.764
## 2021.522       6995.219 5836.023 8154.415 5222.381  8768.056
## 2021.541       7023.520 5845.163 8201.878 5221.378  8825.663
## 2021.560       7059.315 5862.103 8256.527 5228.337  8890.293
## 2021.579       7033.883 5818.109 8249.658 5174.516  8893.251
## 2021.598       7003.093 5769.035 8237.151 5115.764  8890.422
## 2021.617       7001.845 5749.771 8253.919 5086.963  8916.727
## 2021.637       7019.711 5749.876 8289.546 5077.665  8961.756
## 2021.656       7017.103 5729.753 8304.454 5048.270  8985.936
## 2021.675       6910.986 5606.355 8215.617 4915.725  8906.247
## 2021.694       6974.857 5653.171 8296.543 4953.513  8996.201
## 2021.713       6961.778 5623.255 8300.301 4914.683  9008.872
## 2021.732       6884.242 5529.091 8239.394 4811.717  8956.767
## 2021.752       6903.480 5531.902 8275.058 4805.833  9001.128
## 2021.771       6903.635 5515.825 8291.445 4781.163  9026.108
## 2021.790       6987.692 5583.837 8391.546 4840.681  9134.702
## 2021.809       7041.127 5621.409 8460.845 4869.856  9212.398
## 2021.828       7030.350 5594.944 8465.756 4835.086  9225.614
## 2021.847       7052.586 5601.662 8503.510 4833.589  9271.583
## 2021.867       7110.369 5644.091 8576.647 4867.890  9352.848
## 2021.886       7173.630 5692.157 8655.103 4907.912  9439.348
## 2021.905       7053.623 5557.110 8550.137 4764.903  9342.343
## 2021.924       7195.730 5684.325 8707.135 4884.236  9507.224
## 2021.943       7246.154 5720.003 8772.304 4912.108  9580.199
## 2021.962       6904.550 5363.795 8445.305 4548.168  9260.931
## 2021.982       6988.009 5432.787 8543.232 4609.502  9366.517
## 2022.001       7129.978 5560.421 8699.534 4729.548  9530.408
## 2022.020       7141.077 5557.316 8724.838 4718.924  9563.230
## 2022.039       7151.376 5553.537 8749.215 4707.692  9595.060
## 2022.058       7254.695 5642.901 8866.489 4789.669  9719.722
## 2022.077       7128.045 5502.415 8753.674 4641.859  9614.230
## 2022.097       7105.418 5466.070 8744.766 4598.251  9612.584
## 2022.116       7067.822 5414.869 8720.775 4539.849  9595.795
## 2022.135       7071.376 5404.929 8737.822 4522.766  9619.986
## 2022.154       6888.222 5208.390 8568.053 4319.141  9457.303
## 2022.173       6913.297 5220.186 8606.409 4323.907  9502.688
## 2022.192       6737.391 5031.104 8443.678 4127.850  9346.932
## 2022.211       6497.947 4778.584 8217.309 3868.409  9127.485
## 2022.231       6582.596 4850.257 8314.935 3933.212  9231.979
## 2022.250       6638.603 4893.384 8383.822 3969.521  9307.685
## 2022.269       6690.947 4932.943 8448.952 4002.311  9379.583
## 2022.288       6689.860 4919.162 8460.558 3981.812  9397.909
## 2022.307       6627.905 4844.604 8411.206 3900.582  9355.229
## 2022.326       6678.129 4882.314 8473.945 3931.667  9424.592
## 2022.346       6717.645 4909.402 8525.888 3952.175  9483.114
## 2022.365       6619.432 4798.846 8440.018 3835.085  9403.778
## 2022.384       6687.536 4854.690 8520.383 3884.440  9490.633
## 2022.403       6825.333 4980.308 8670.357 4003.611  9647.054
```

```
## 2022.422       7011.709 5154.586 8868.833 4171.484  9851.934
## 2022.441       6971.194 5102.051 8840.338 4112.586  9829.803
## 2022.461       6842.531 4961.444 8723.618 3965.657  9719.406
## 2022.480       6870.734 4977.779 8763.689 3975.709  9765.759
## 2022.499       6940.724 5035.974 8845.473 4027.661  9853.787
## 2022.518       6995.219 5078.748 8911.690 4064.229  9926.209
## 2022.537       7023.520 5095.399 8951.642 4074.713  9972.328
## 2022.556       7059.315 5119.613 8999.017 4092.797 10025.833
## 2022.576       7033.883 5082.670 8985.097 4049.760 10018.007
## 2022.595       7003.093 5040.435 8965.750 4001.467 10004.719
## 2022.614       7001.845 5027.809 8975.880 3982.818 10020.872
## 2022.633       7019.711 5034.362 9005.059 3983.383 10056.038
## 2022.652       7017.103 5020.507 9013.700 3963.573 10070.634
## 2022.671       6910.986 4903.204 8918.768 3840.348  9981.624
## 2022.691       6974.857 4955.952 8993.763 3887.208 10062.507
## 2022.710       6961.778 4931.810 8991.746 3857.209 10066.346
## 2022.729       6884.242 4843.271 8925.213 3762.847 10005.637
## 2022.748       6903.480 4851.566 8955.395 3765.348 10041.612
## 2022.767       6903.635 4840.835 8966.435 3748.855 10058.415
## 2022.786       6987.692 4914.064 9061.320 3816.351 10159.032
## 2022.806       7041.127 4956.726 9125.527 3853.312 10228.942
## 2022.825       7030.350 4935.233 9125.467 3826.145 10234.555
## 2022.844       7052.586 4946.806 9158.365 3832.074 10273.097
## 2022.863       7110.369 4993.981 9226.757 3873.633 10347.105
## 2022.882       7173.630 5046.687 9300.573 3920.751 10426.509
## 2022.901       7053.623 4916.176 9191.070 3784.680 10322.566
## 2022.921       7195.730 5047.831 9343.629 3910.802 10480.658
## 2022.940       7246.154 5087.853 9404.454 3945.318 10546.990
```

This will show the tail (last 5 data points), minimum, maximum, and which entry is the minimum.

```
tail(psei)
```

```
## Time Series:
## Start = 2020.8507871321
## End = 2020.94661190965
## Frequency = 52.1785714285714
##        Price
## [1,] 6685.69
## [2,] 6969.88
## [3,] 7169.79
## [4,] 6791.46
## [5,] 7134.56
## [6,] 7246.16
```

```
min(psei)
```

```
## [1] 4778.76
```

```
max(psei)
```

```
## [1] 9041.2
```

```
which.min(psei)
```

```
## [1] 241
```

ARIMA

This is a command for auto arima.

```
bestfit_psei <- list(aicc=Inf)
for(i in 1:25)
{
  fit_psei <- auto.arima(psei, xreg=fourier(psei, K=i), seasonal=FALSE)
  if(fit_psei$aicc < bestfit_psei$aicc)
    bestfit_psei <- fit_psei
  else break;
}
```

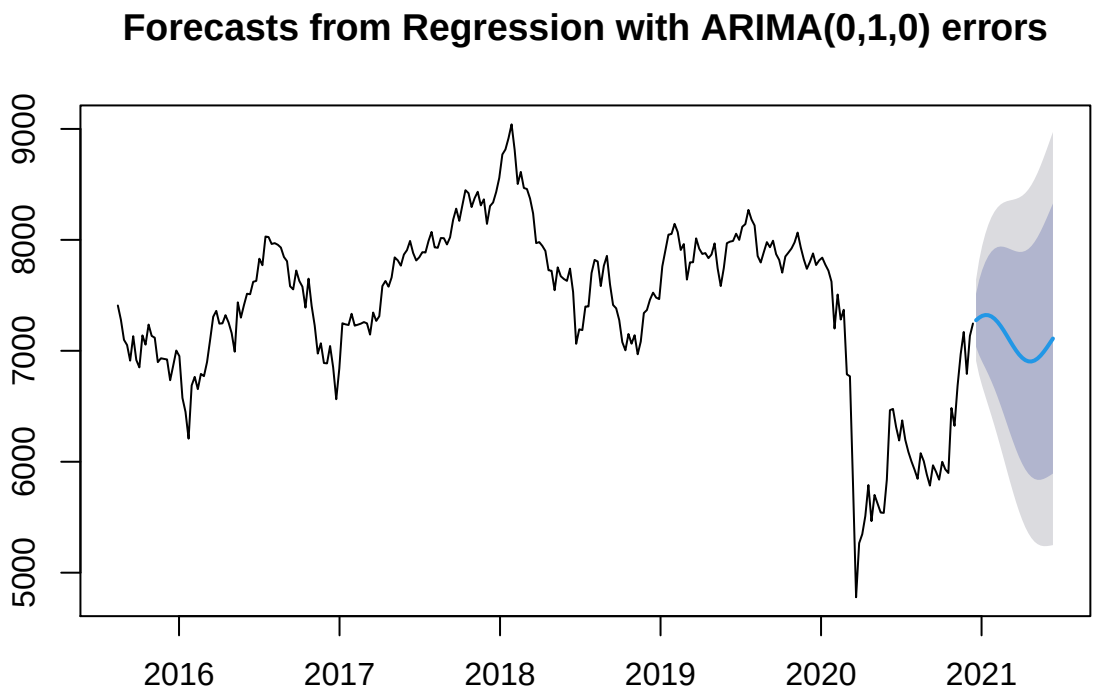
The summary of the ARIMA model.

```
summary(bestfit_psei)
```

```
## Series: psei
## Regression with ARIMA(0,1,0) errors
##
## Coefficients:
##          S1-52     C1-52     S2-52     C2-52
##        76.1585   -6.1622  -97.6236  123.4915
## s.e.  131.7154  129.4198   65.3417   65.4326
##
## sigma^2 estimated as 34707:  log likelihood=-1845.65
## AIC=3701.31   AICc=3701.53   BIC=3719.45
##
## Training set error measures:
##                      ME     RMSE      MAE         MPE     MAPE      MASE
## Training set -0.610717 184.6221 131.8597 -0.04753934 1.877225 0.1616295
##                      ACF1
## Training set -0.01308952
```

The plot of the ARIMA model.

```
fc_arima_psei <- forecast(bestfit_psei, xreg=fourier(psei, K=2, h=26))
plot(fc_arima_psei)
```



These are the point forecast, the 80% and the 95% confidence interval.

```
fc_arima_psei
```

```
##          Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
## 2020.966       7275.305 7036.553 7514.056 6910.165 7640.444
## 2020.985       7298.755 6961.109 7636.401 6782.370 7815.140
## 2021.004       7314.899 6901.369 7728.429 6682.459 7947.339
## 2021.023       7322.511 6845.008 7800.014 6592.232 8052.790
## 2021.042       7320.828 6786.963 7854.693 6504.352 8137.304
## 2021.062       7309.599 6724.779 7894.419 6415.194 8204.004
## 2021.081       7289.102 6657.424 7920.780 6323.034 8255.170
## 2021.100       7260.136 6584.844 7935.428 6227.366 8292.906
## 2021.119       7223.980 6507.724 7940.235 6128.562 8319.398
## 2021.138       7182.322 6427.323 7937.321 6027.650 8336.994
## 2021.157       7137.172 6345.322 7929.022 5926.142 8348.202
## 2021.177       7090.749 6263.688 7917.809 5825.869 8355.628
## 2021.196       7045.356 6184.525 7906.188 5728.828 8361.885
## 2021.215       7003.260 6109.933 7896.587 5637.034 8369.486
## 2021.234       6966.557 6041.876 7891.239 5552.379 8380.735
## 2021.253       6937.064 5982.057 7892.071 5476.507 8397.621
## 2021.272       6916.212 5931.813 7900.611 5410.704 8421.720
## 2021.292       6904.973 5892.035 7917.911 5355.818 8454.128
## 2021.311       6903.803 5863.108 7944.497 5312.198 8495.408
## 2021.330       6912.619 5844.889 7980.350 5279.667 8545.572
## 2021.349       6930.810 5836.712 8024.908 5257.532 8604.089
## 2021.368       6957.268 5837.423 8077.113 5244.613 8669.923
```

```
## 2021.387       6990.456 5845.443 8135.469 5239.310 8741.602
## 2021.407       7028.497 5858.857 8198.137 5239.687 8817.307
## 2021.426       7069.281 5875.522 8263.040 5243.585 8894.978
## 2021.445       7110.586 5893.186 8327.985 5248.733 8972.438
```

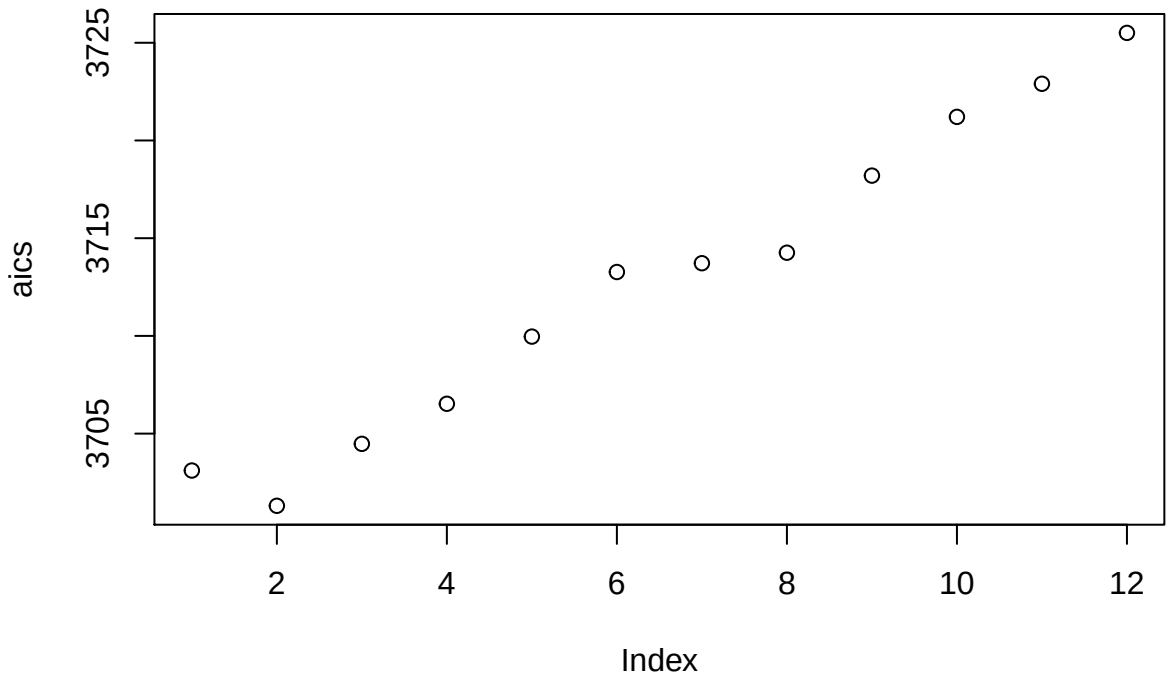
Manual ARIMA

This will generate 12 arima models.

```
fit_psei1 <- auto.arima(psei, xreg=fourier(psei, K=1), seasonal=FALSE)
fit_psei2 <- auto.arima(psei, xreg=fourier(psei, K=2), seasonal=FALSE)
fit_psei3 <- auto.arima(psei, xreg=fourier(psei, K=3), seasonal=FALSE)
fit_psei4 <- auto.arima(psei, xreg=fourier(psei, K=4), seasonal=FALSE)
fit_psei5 <- auto.arima(psei, xreg=fourier(psei, K=5), seasonal=FALSE)
fit_psei6 <- auto.arima(psei, xreg=fourier(psei, K=6), seasonal=FALSE)
fit_psei7 <- auto.arima(psei, xreg=fourier(psei, K=7), seasonal=FALSE)
fit_psei8 <- auto.arima(psei, xreg=fourier(psei, K=8), seasonal=FALSE)
fit_psei9 <- auto.arima(psei, xreg=fourier(psei, K=9), seasonal=FALSE)
fit_psei10 <- auto.arima(psei, xreg=fourier(psei, K=10), seasonal=FALSE)
fit_psei11 <- auto.arima(psei, xreg=fourier(psei, K=11), seasonal=FALSE)
fit_psei12 <- auto.arima(psei, xreg=fourier(psei, K=12), seasonal=FALSE)
```

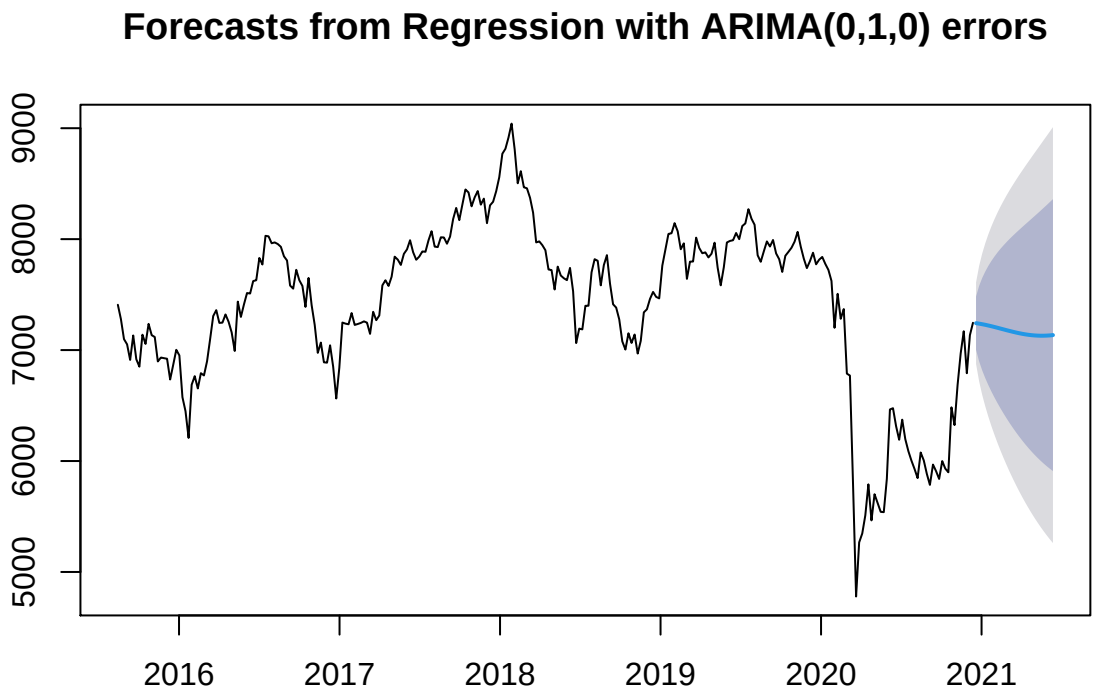
This will plot the AIC of the 12 ARIMA models.

```
aics<-c(AIC(fit_psei1),AIC(fit_psei2),AIC(fit_psei3),AIC(fit_psei4),AIC(fit_psei5),AIC(fit_psei6),AIC(f
plot(aics)
```



This is the plot of the 1st ARIMA model.

```
fc_psei1 <- forecast(fit_psei1, xreg=fourier(psei, K=1, h=26))
plot(fc_psei1)
```



These are the point forecast, the 80% and the 95% confidence interval.

```
fc_psei1
```

```
##          Point Forecast    Lo 80    Hi 80    Lo 95    Hi 95
## 2020.966       7242.603 7002.222 7482.985 6874.971 7610.235
## 2020.985       7238.296 6898.345 7578.247 6718.386 7758.206
## 2021.004       7233.300 6816.946 7649.653 6596.542 7870.057
## 2021.023       7227.687 6746.924 7708.451 6492.424 7962.951
## 2021.042       7221.540 6684.031 7759.050 6399.490 8043.590
## 2021.062       7214.948 6626.135 7803.760 6314.437 8115.458
## 2021.081       7208.005 6572.015 7843.995 6235.342 8180.667
## 2021.100       7200.812 6520.910 7880.714 6160.992 8240.632
## 2021.119       7193.474 6472.329 7914.618 6090.578 8296.369
## 2021.138       7186.096 6425.943 7946.249 6023.542 8348.650
## 2021.157       7178.786 6381.530 7976.042 5959.489 8398.083
## 2021.177       7171.649 6338.943 8004.356 5898.135 8445.164
## 2021.196       7164.789 6298.081 8031.498 5839.274 8490.305
## 2021.215       7158.306 6258.880 8057.731 5782.753 8533.858
## 2021.234       7152.292 6221.298 8083.286 5728.460 8576.124
## 2021.253       7146.835 6185.309 8108.362 5676.308 8617.363
## 2021.272       7142.015 6150.896 8133.134 5626.230 8657.800
## 2021.292       7137.901 6118.048 8157.753 5578.170 8697.631
```

```
## 2021.311       7134.552 6086.753 8182.351 5532.081 8737.022
## 2021.330       7132.017 6056.998 8207.036 5487.917 8776.117
## 2021.349       7130.333 6028.766 8231.900 5445.632 8815.034
## 2021.368       7129.524 6002.034 8257.014 5405.177 8853.871
## 2021.387       7129.602 5976.772 8282.432 5366.501 8892.703
## 2021.407       7130.566 5952.941 8308.190 5329.544 8931.587
## 2021.426       7132.401 5930.493 8334.309 5294.241 8970.561
## 2021.445       7135.082 5909.371 8360.792 5260.519 9009.644
```

Accuray Measures

These are the accuracy measures for each model.

```
accuracy(fc_psei)
```

```
##                       ME     RMSE      MAE         MPE     MAPE      MASE
## Training set -0.9257393 164.5662 123.2156 -0.04584779 1.735195 0.1510338
##                      ACF1
## Training set 0.009483672
```

```
accuracy(fc_arima_psei)
```

```
##                      ME     RMSE      MAE         MPE     MAPE      MASE
## Training set -0.610717 184.6221 131.8597 -0.04753934 1.877225 0.1616295
##                      ACF1
## Training set -0.01308952
```

```
accuracy(fc_psei1)
```

```
##                       ME     RMSE      MAE         MPE     MAPE      MASE
## Training set -0.7638461 186.5596 133.3621 -0.05103483 1.895593 0.1634711
##                      ACF1
## Training set 0.006575347
```