

Run S-5 With Retained Values

Automatic Forecasting Systems Inc.

2017-08-18

```
# Save the current working directory.
saveWd <- getwd()

# Move to the Documents\AutoboxR directory.
setwd("~/AutoboxR")

# Load the library.
library(autobox)

# Initialize the autobox package.
autoboxInitPackage()

## [[1]]
## [1] 0
##
## [[2]]
## [1] "License status: active license, will expire on Fri Aug 18 14:57:19 2017."

# Set the S_5 values.
dblHistoricalValues_S_5 <- c(
  5,1.6863,15.65859,12.64733,20.71753,34.20801,46.61443,38.06243,62.63438,
  11.08147,39.50784,36.01477,13.37003,32.88305,13.61093,9.39516,6.98614,
  2.52947,8.91335,9.39516,39.86919,51.79381,37.33973,7.46795,10.59966,
  5.66118,4.93848,39.50784,2.77037,15.05634,41.3146,14.45409,0,
  55.04598,36.49657,34.32846,41.7964,6.62479,11.32237,5.29983,
  1.08406,2.16811,52.27562,4.09532,26.37871,21.19933,35.77387,26.25826,
  7.10659,14.21319,7.22704,9.39516,13.85183,4.21578,8.91335,0,
  4.33623,7.22704,14.33364,1.20451,22.28338,7.22704,3.61352,0.4818,
  1.80676,36.97837,0,0,0,3.37262,12.88823)

# Create a matrix with one column of S_5 values.
mS_5 <- matrix(dblHistoricalValues_S_5,
  ncol=1,
  dimnames=list(c(1:length(dblHistoricalValues_S_5)),c("S_5")))

# Create a time series from the matrix.
tsS_5 <- ts(mS_5,start=c(1980,1),frequency=12)

# Make an S-5 autobox object with retained data.
objS_5_retained <- autobox(tsS_5,
  iDataType=c(0),
  iObjective=c(0,0,0),
  iNumberOfRetainedValues=10,
  iNumberOfForecastValues=10,
  cPath=".\\Output")
```

```
# Run the calculation.
objS_5_retained <- autoboxRun(objS_5_retained)
```

```
# Print the status.
print(objS_5_retained$cStatus)
```

```
## [1] "S_5: Autobox calculation complete, return code = 0."
```

```
# Print the results
# The selection parameter selects the values to print:
# a = Actual,
# c = Cleansed (Adjusted),
# e = Equations,
# f = Forecast,
# h = Historical,
# i = Interventions,
# r = Residual,
# s = Statistics,
# t = Fitted.
autoboxPrint(objS_5_retained,selection="acefhirst")
```

```
## [1] "
## [2] " AUTOMATIC FORECASTING SYSTEMS
## [3] " HATBORO PA 19040
## [4] " 215-675-0652
## [5] " VERSION: 08/10/2017 16:33
## [6] "
## [7] " GENERALIZED LINEAR MODEL
## [8] "
## [9] "
## [10] "MODELLING OUTPUT SERIES:S_5
## [11] "
## [12] "
## [13] "
## [14] "Y(T) = 26.169 S_5
## [15] " +[X1(T)] [(+ 46.4273)] :PULSE 1983/ 7 43 I~ "
## [16] " +[X2(T)] [(+ 37.3119)] :PULSE 1980/ 9 9 I~ "
## [17] " +[X3(T)] [(+ 46.4590)] :PULSE 1982/ 10 34 I~ "
## [18] " +[X4(T)] [(+ 20.0034)] :SEASONAL PULSE 1980/ 11 11 I~ "
## [19] " +[X5(T)] [(+ 33.2703)] :PULSE 1982/ 4 28 I~ "
## [20] " +[X6(T)] [(+ 40.3601)] :PULSE 1981/ 10 22 I~ "
## [1] "S_5 1980 1 12 13
## [2] " 1
## [3] " 0.1854D+02
## [4] " 0.1000D+01 0.0000D+00
## [5] " 1 0 0 0
## [6] " 1
## [7] " 1
## [8] " 0.2914D+00
## [9] "I~P00043S_5
## [10] " 0.1000D+01 0.0000D+00
## [11] " 0 0 1 0
## [12] " 1
```

```

## [13] "      0
## [14] " 0.4643D+02
## [15] "I~P00009S_5
## [16] " 0.1000D+01 0.0000D+00
## [17] "      0      0      1      0
## [18] "      1
## [19] "      0
## [20] " 0.3731D+02
## [21] "I~P00034S_5
## [22] " 0.1000D+01 0.0000D+00
## [23] "      0      0      1      0
## [24] "      1
## [25] "      0
## [26] " 0.4646D+02
## [27] "I~S00011S_5
## [28] " 0.1000D+01 0.0000D+00
## [29] "      0      0      1      0
## [30] "      1
## [31] "      0
## [32] " 0.2000D+02
## [33] "I~P00028S_5
## [34] " 0.1000D+01 0.0000D+00
## [35] "      0      0      1      0
## [36] "      1
## [37] "      0
## [38] " 0.3327D+02
## [39] "I~P00022S_5
## [40] " 0.1000D+01 0.0000D+00
## [41] "      0      0      1      0
## [42] "      1
## [43] "      0
## [44] " 0.4036D+02
## [45] "I~P00031S_5
## [46] " 0.1000D+01 0.0000D+00
## [47] "      0      0      1      0
## [48] "      1
## [49] "      0
## [50] " 0.2923D+02
## [51] "I~P00021S_5
## [52] " 0.1000D+01 0.0000D+00
## [53] "      0      0      1      0
## [54] "      1
## [55] "      0
## [56] " 0.3011D+02
## [57] "I~P00037S_5
## [58] " 0.1000D+01 0.0000D+00
## [59] "      0      0      1      0
## [60] "      1
## [61] "      0
## [62] " 0.3290D+02
## [63] "I~L00015S_5
## [64] " 0.1000D+01 0.0000D+00
## [65] "      0      0      1      0
## [66] "      1

```

```

## [67] "      0
## [68] " -0.1717D+02
## [69] "I~P00036S_5
## [70] "  0.1000D+01  0.0000D+00
## [71] "      0      0      1      0
## [72] "      1
## [73] "      0
## [74] "  0.2335D+02
## [75] "I~P00045S_5
## [76] "  0.1000D+01  0.0000D+00
## [77] "      0      0      1      0
## [78] "      1
## [79] "      0
## [80] "  0.1543D+02
##      Period    Actual Adjusted Forecast LowerLimits UpperLimits      S_5
## 1  1980 1  5.00000  5.00000      NA      NA      NA  5.00000
## 2  1980 2  1.68630  1.68630      NA      NA      NA  1.68630
## 3  1980 3 15.65859 15.65859      NA      NA      NA 15.65859
## 4  1980 4 12.64733 12.64733      NA      NA      NA 12.64733
## 5  1980 5 20.71753 20.71753      NA      NA      NA 20.71753
## 6  1980 6 34.20801 34.20801      NA      NA      NA 34.20801
## 7  1980 7 46.61443 46.61443      NA      NA      NA 46.61443
## 8  1980 8 38.06243 38.06243      NA      NA      NA 38.06243
## 9  1980 9 62.63438 25.32248      NA      NA      NA 62.63438
## 10 1980 10 11.08147 11.08147      NA      NA      NA 11.08147
## 11 1980 11 39.50784 39.50784      NA      NA      NA 39.50784
## 12 1980 12 36.01477 36.01477      NA      NA      NA 36.01477
## 13 1981 1 13.37003 13.37003      NA      NA      NA 13.37003
## 14 1981 2 32.88305 32.88305      NA      NA      NA 32.88305
## 15 1981 3 13.61093 30.78555      NA      NA      NA 13.61093
## 16 1981 4  9.39516 26.56978      NA      NA      NA  9.39516
## 17 1981 5  6.98614 24.16076      NA      NA      NA  6.98614
## 18 1981 6  2.52947 19.70409      NA      NA      NA  2.52947
## 19 1981 7  8.91335 26.08797      NA      NA      NA  8.91335
## 20 1981 8  9.39516 26.56978      NA      NA      NA  9.39516
## 21 1981 9 39.86919 26.93022      NA      NA      NA 39.86919
## 22 1981 10 51.79381 28.60829      NA      NA      NA 51.79381
## 23 1981 11 37.33973 54.51435      NA      NA      NA 37.33973
## 24 1981 12  7.46795 24.64257      NA      NA      NA  7.46795
## 25 1982 1 10.59966 27.77428      NA      NA      NA 10.59966
## 26 1982 2  5.66118 22.83580      NA      NA      NA  5.66118
## 27 1982 3  4.93848 22.11310      NA      NA      NA  4.93848
## 28 1982 4 39.50784 23.41221      NA      NA      NA 39.50784
## 29 1982 5  2.77037 19.94499      NA      NA      NA  2.77037
## 30 1982 6 15.05634 32.23096      NA      NA      NA 15.05634
## 31 1982 7 41.31460 29.26018      NA      NA      NA 41.31460
## 32 1982 8 14.45409 31.62871      NA      NA      NA 14.45409
## 33 1982 9  0.00000 17.17462      NA      NA      NA  0.00000
## 34 1982 10 55.04598 25.76165      NA      NA      NA 55.04598
## 35 1982 11 36.49657 53.67119      NA      NA      NA 36.49657
## 36 1982 12 34.32846 28.15662      NA      NA      NA 34.32846
## 37 1983 1 41.79640 26.06829      NA      NA      NA 41.79640
## 38 1983 2  6.62479 23.79941      NA      NA      NA  6.62479
## 39 1983 3 11.32237 28.49699      NA      NA      NA 11.32237

```

## 40	1983 4	5.29983	22.47445	NA	NA	NA	5.29983
## 41	1983 5	1.08406	18.25868	NA	NA	NA	1.08406
## 42	1983 6	2.16811	19.34273	NA	NA	NA	2.16811
## 43	1983 7	52.27562	23.02291	NA	NA	NA	52.27562
## 44	1983 8	4.09532	21.26994	NA	NA	NA	4.09532
## 45	1983 9	26.37871	28.12254	NA	NA	NA	26.37871
## 46	1983 10	21.19933	38.37395	NA	NA	NA	21.19933
## 47	1983 11	35.77387	52.94849	NA	NA	NA	35.77387
## 48	1983 12	26.25826	43.43288	NA	NA	NA	26.25826
## 49	1984 1	7.10659	24.28121	NA	NA	NA	7.10659
## 50	1984 2	14.21319	31.38781	NA	NA	NA	14.21319
## 51	1984 3	7.22704	24.40166	NA	NA	NA	7.22704
## 52	1984 4	9.39516	26.56978	NA	NA	NA	9.39516
## 53	1984 5	13.85183	31.02645	NA	NA	NA	13.85183
## 54	1984 6	4.21578	21.39040	NA	NA	NA	4.21578
## 55	1984 7	8.91335	26.08797	NA	NA	NA	8.91335
## 56	1984 8	0.00000	17.17462	NA	NA	NA	0.00000
## 57	1984 9	4.33623	21.51085	NA	NA	NA	4.33623
## 58	1984 10	7.22704	24.40166	NA	NA	NA	7.22704
## 59	1984 11	14.33364	31.50826	NA	NA	NA	14.33364
## 60	1984 12	1.20451	18.37913	NA	NA	NA	1.20451
## 61	1985 1	22.28338	39.45800	NA	NA	NA	22.28338
## 62	1985 2	NA	NA	12.86700	0.00000	29.24600	7.22704
## 63	1985 3	NA	NA	10.12300	0.00000	27.18400	3.61352
## 64	1985 4	NA	NA	9.32300	0.00000	26.44100	0.48180
## 65	1985 5	NA	NA	9.09000	0.00000	26.21300	1.80676
## 66	1985 6	NA	NA	9.02300	0.00000	26.14500	36.97837
## 67	1985 7	NA	NA	9.00300	0.00000	26.12500	0.00000
## 68	1985 8	NA	NA	8.99700	0.00000	26.12000	0.00000
## 69	1985 9	NA	NA	8.99500	0.00000	26.11800	0.00000
## 70	1985 10	NA	NA	8.99500	0.00000	26.11800	3.37262
## 71	1985 11	NA	NA	28.99800	11.87500	46.12100	12.88823
##	Residuals	Fitted					
## 1	0.00000	5.00000					
## 2	-11.13636	12.82266					
## 3	-2.05322	17.71181					
## 4	-6.35988	19.00721					
## 5	-0.91916	21.63669					
## 6	5.85400	28.35401					
## 7	11.00762	35.60681					
## 8	3.60929	34.45314					
## 9	-2.62214	65.25652					
## 10	-9.02428	20.10575					
## 11	-1.37936	40.88720					
## 12	7.16757	28.84720					
## 13	-9.52716	22.89719					
## 14	10.44332	22.43973					
## 15	2.65999	10.95094					
## 16	-0.94460	10.33976					
## 17	-2.12520	9.11134					
## 18	-5.87991	8.40938					
## 19	1.80258	7.11077					
## 20	0.42421	8.97095					
## 21	0.64426	39.22493					

```

## 22  2.21730 49.57651
## 23  7.63097 29.70876
## 24 -3.95734 11.42529
## 25  2.04988  8.54978
## 26 -3.80114  9.46232
## 27 -3.08483  8.02331
## 28 -1.57514 41.08298
## 29 -5.42090  8.19127
## 30  7.87537  7.18097
## 31  1.32462 39.98998
## 32  4.55880  9.89529
## 33 -10.58545 10.58545
## 34  2.21331 52.83267
## 35  7.61729 28.87928
## 36 -0.19760 34.52606
## 37 -0.68006 42.47646
## 38 -2.34042  8.96521
## 39  3.01828  8.30409
## 40 -4.37307  9.67290
## 41 -6.83396  7.91802
## 42 -4.52149  6.68960
## 43 -1.15719 53.43281
## 44 -3.98251  8.07783
## 45  3.38087 22.99784
## 46 11.63554  9.56379
## 47  3.21953 32.55434
## 48 15.28925 10.96901
## 49 -6.91843 14.02502
## 50  5.76871  8.44448
## 51 -3.28821 10.51525
## 52  0.91558  8.47958
## 53  4.74049  9.11134
## 54 -6.19418 10.40996
## 55  1.31121  7.60214
## 56 -8.97095  8.97095
## 57 -2.03749  6.37372
## 58 -0.41020  7.63724
## 59 -14.14936 28.48300
## 60 -3.51711  4.72162
## 61 15.55869  6.72469
## 62      NA      NA
## 63      NA      NA
## 64      NA      NA
## 65      NA      NA
## 66      NA      NA
## 67      NA      NA
## 68      NA      NA
## 69      NA      NA
## 70      NA      NA
## 71      NA      NA

```

```

##                               Statistic      Value
## 1                               RSQ      0.7838584
## 2      RMSE (VARIANCE OF ERRORS)      8.6405211
## 3          STD DEV OF ERRORS      0.0000000

```

```

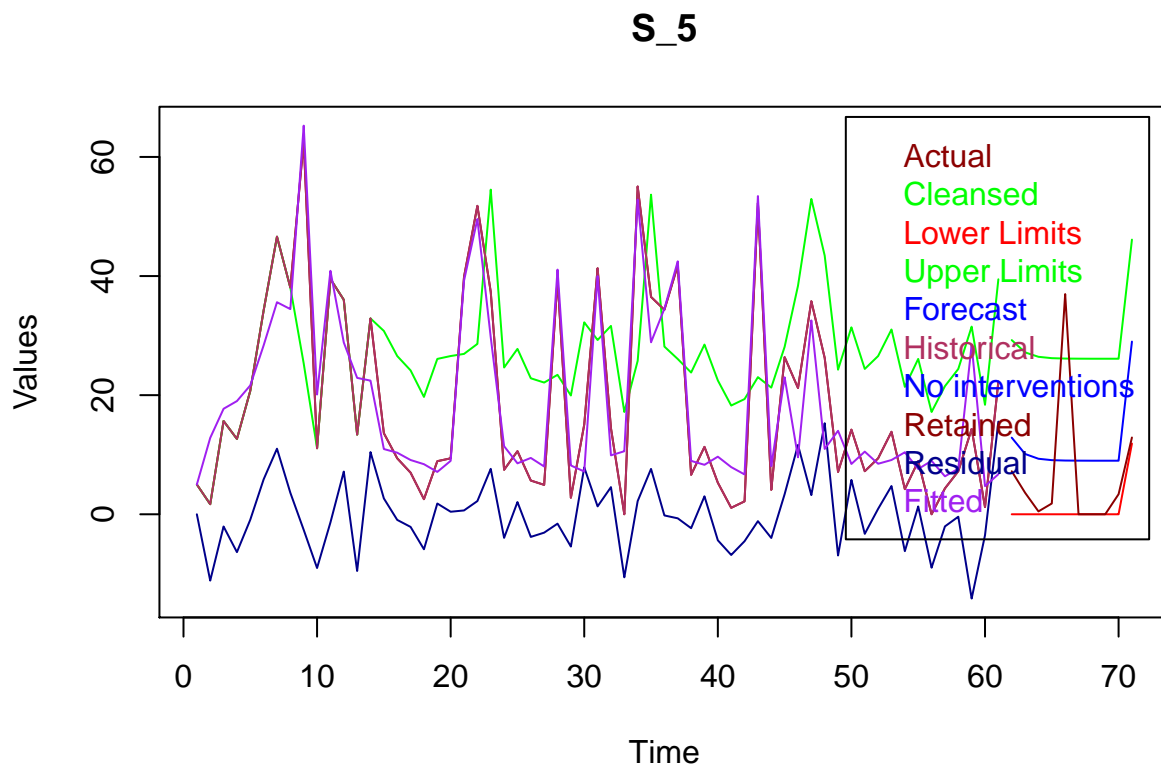
## 4                                MAPE      0.6511059
## 5                                SUM OF FORECASTS 115.4140000
## 6                                DAYS LEFT IN TRIAL PERIOD 4.0000000
## 7                                NOT ACTIVE 0.0000000
## 8                                FORECAST CONFIDENCE INTERVAL 95.0000000
## 9                                SUM OF SQUARES OF RESIDUALS 3508.9544363
## 10                               DEGREES OF FREEDOM FOR MODEL 47.0000000
## 11                               NUMBER OF PARAMETERS IN MODEL 14.0000000
## 12 SEASONAL INDICATOR (1 IF THERE ARE ANY SEASONAL ELEMENTS) 1.0000000
## 13                               NULL 0.0000000

```

```

# Plot the result.
# The selection parameter selects the values to plot:
# a = Actual,
# c = Cleansed (Adjusted),
# f = Forecast,
# h = Historical,
# i = Interventions,
# n = Retained,
# r = Residual,
# t = Fitted,
# u = Future.
autoboxPlot(objS_5_retained,selection="acfhinrtu")

```



```
# Unload the autobox library.  
unloadNamespace("autobox")  
  
# Restore the working directory.  
setwd(saveWd)
```