KSPA Test - R Code

The Kolmogorov-Smirnov Predictive Accuracy test

```
# Install and load the "stats" package in R.

install.packages("stats")

library(stats)

# Input the forecast errors from two models. Let Error1 show errors
from the model with the lower error based on some loss function.

Error1<-scan()
Error2<-scan()

# Convert the raw forecast errors into absolute values or squared values
depending on the loss function.

abs1<-abs(Error1)
abs2<-abs(Error2)

sqe1<-(Error1)^2
sqe2<-(Error2)^2

# Perform the KSPA test for distinguishing between
the predictive accuracy of forecasts from the two models*.

#Two-sided KSPA test:

ks.test(abs1,abs2)

#One-sided KSPA test:

ks.test(abs1,abs2, alternative = c("greater"))

OPTIONAL GRAPHS FOR MORE INFORMATION

# Draw histograms for the forecast errors from each model.

par(mfrow=c(1,2))
hist(abs1, xlab="Model 1 Absolute Errors", main="")
hist(abs2, xlab="Model 2 Absolute Errors",main="")

# Plot the cdf of forecast errors from each model*.

plot(ecdf(abs1),do.points=T,col="red",xlim=range(abs1,abs2),main="")
plot(ecdf(abs2),do.points=T,col="blue",add=TRUE, main="")
legend("bottomright",legend=c("Model 1 Absolute Errors","Model 2
Absolute Errors"), lty=1, col=c("red","blue"))

# NOTE: *Replace abs1 and abs2 with sqe1 and sqe2 as appropriate.
```

Scenario 1. Tourism

| ARIMA Errors | SSA Errors |
|---|---|
| 795149.19 | 225817.35 |
| 209376.50 | 72187.54 |
| 200317.02 | 178298.81 |
| 97683.34 | 167614.26 |
| 1739430.30 | 199598.43 |
| 495094.94 | 326775.65 |
| -70556.23 | -587.38 |
| 240610.97 | -83421.65 |
| 122714.29 | -39990.60 |
| 524521.47 | -198688.58 |
| -540850.02 | -212824.82 |
| 78226.90 | -46336.36 |
| 1229165.52 | 482909.22 |
| 139176.95 | -394448.29 |
| 561840.01 | 333170.16 |
| 137117.47 | -66304.01 |
| 1054261.47 | -166084.82 |
| 549655.90 | 210300.26 |
| -828963.78 | -232929.82 |
| -62918.48 | -280913.21 |
| -1113369.80 | -388423.20 |
| 74241.49 | -222825.30 |
| -400257.37 | -60414.35 |
| -318717.15 | 99834.27 |
| 82522.42 | -145938.90 |
| 233823.15 | 378272.56 |
| 172571.96 | 63470.35 |
| -40903.54 | 18753.70 |
| 892801.08 | -128381.31 |
| 470339.20 | 176936.47 |
| -388368.21 | 122233.24 |
| 171382.39 | 84468.84 |
| -1067076.58 | -129011.57 |
| 110092.28 | 79761.04 |
| 472503.39 | 892750.72 |
| -106976.02 | 314509.05 |
| 581993.97 | -64807.51 |
| 47197.06 | -103745.09 |
| 858047.82 | 131266.00 |
| 135407.34 | -145367.42 |
| 1312622.11 | -4118.46 |
| 385356.70 | -174020.91 |
| -756570.34 | 35984.77 |
| 444284.30 | 156262.49 |
| -967544.35 | -59542.54 |
| 263207.75 | 2273.96 |
| -313744.31 | -296998.25 |
| -213957.94 | -242355.58 |
| 278043.09 | -299876.65 |
| 518492.29 | 735663.71 |
| 396361.06 | 151165.12 |
| 98322.92 | 175142.76 |
| 1332741.14 | 273427.54 |

| | |
|---|---|
| 207744.39 | -151360.18 |
| -343512.37 | -39996.11 |
| 270942.45 | -44295.11 |
| -983574.20 | 1276.13 |
| -112593.48 | -102809.48 |
| -100674.61 | -16425.28 |
| -227438.86 | 151957.59 |
| 445085.71 | 420197.48 |
| 67327.93 | 7741.56 |
| 348658.75 | -208754.24 |
| 213895.23 | 139055.23 |
| 1548731.60 | 369775.96 |
| 112250.89 | -218241.95 |
| -237979.74 | -20260.31 |
| 53245.46 | -309109.21 |
| -1116618.29 | -149808.48 |

Scenario 2. Accidental Deaths

| ARIMA Errors | NN Errors |
|---|---|
| -38.17 | 1823.22 |
| 313.77 | 1035.13 |
| 675.04 | 920.87 |
| 192.55 | 399.10 |
| 305.97 | 706.29 |
| 473.91 | 1675.10 |
| -136.69 | -210.01 |
| 291.57 | -485.57 |
| 455.28 | -261.11 |
| 264.43 | -313.18 |
| 112.27 | 686.13 |
| -145.98 | 563.48 |

Scenario 3. Trade

| ETS Errors | SSA Errors |
|---|---|
| 27109.02 | -693.14 |
| 19547.02 | -8178.05 |
| 30385.02 | 4524.31 |
| 2640.33 | 4009.04 |
| -4826.68 | -1084.51 |
| 1098.72 | 5172.81 |
| -8509.20 | -4157.76 |
| -9433.05 | -3860.80 |
| -14649.66 | -9176.14 |
| -14316.03 | -17386.41 |