

Errata for Modeling Financial Time Series with S-PLUS

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Preface

1. viii. Change jwang@insightful.com to jwang@svolatility.com

Chapter 1: S and S-PLUS

Chapter 2: Time Series Specification, Manipulation, and Visualization in S-PLUS

Chapter 3: Time Series Concepts

1. Page 62. The denominator in $MQ(k)$ should be $T-j$, not $T-k$ as printed. (Added January 3, 2005. Error found by Mike Steele.)

2. Page 72 (signal plus noise model example). q should be $\frac{\sigma_\eta^2}{\sigma_\varepsilon^2}$. Also, the code to simulate the signal plus noise model is incorrect. The random normals should be computed using

```
> eps = rnorm(100, sd=1)
> eta = rnorm(100, sd=0.5)
```

The graph will change, and the value of q is 0.25 and the value of ρ_1 is -0.444.

(Added February 15, 2005. Error found by Ralf Hofrath.)

3. Page 74. "PACF" should be "SPACF"
4. Page 100. In caption for Figure 3.17, "four" should be "two".
5. Page 100. Equations at bottom of page should be in bold type.
6. Page 102. In equation (3.29), Γ values should be in bold type

Chapter 4: Unit Root Tests

1. Page 123. In equations (4.8) and (4.9), " \rightarrow " should be " $\overset{d}{\rightarrow}$ "

Chapter 5: Modeling Extreme Values

1. Page 142, Example 24. First line of code should be

```
> rlevel.year.40 = rlevel.gev(gev.fit.year, k.blocks=40,
+                             type="profile")
```

(Added February 28, 2005.)

- Page 147. Equation (5.11) should be

$$G_{\xi, \beta(u)}(y) = \begin{cases} 1 - (1 + (\xi y / \beta(u))^{-1/\xi}) & \text{for } \xi \neq 0 \\ 1 - \exp(-y / \beta(u)) & \text{for } \xi = 0 \end{cases}$$

(Added January 3, 2005)

- Page 147, Example 25. The value of ξ for the Pareto distribution should be 0.5.
- Page 147, Example 25. In the code to compute the plots for the CDFs and pdfs, the legend entry for the CDFs should be

```
> legend(1, 0.2, legend=c("Pareto G(0.5,1)", "Exponential  
+ G(0,1)", "Pareto II G(-0.5,1)"), lty=1:3)
```

(Added February 27, 2005)

- Page 150. The two sentences prior to Example 27 should read “An upward sloping plot indicates heavy-tailed behavior. In particular, a straight line with positive slope above u_0 is a sign of Pareto behavior in tail. A downward trend shows thin-tailed behavior, whereas a line with zero slope shows an exponential tail.”

(Added February 28, 2005)

- Page 150, Example 27. Replace last two sentences with “The mean excess plot for the S&P 500 negative returns is linear in u with positive slope for $u > 1$ indicating Pareto tail behavior. The plot for the fire loss data is upward sloping and linear for almost all values of u . However, there is a slight kink at $u=10$.”

(Added February 28, 2005)

- Page 155, Example 29. Delete the first line of code:

```
> gpd.fit.10 = gpd(danish, threshold=10)
```

(Added February 28, 2005)

Chapter 6: Time Series Regression Modeling

- Page 188. Sentence ending with “...change in x_t on y_t is” should be “...change in x_t on y_t ”.
- Page 189. In example 34, $\phi(R_{it} - r_{ft})$ should be $\phi(R_{it-1} - r_{ft-1})$

Chapter 7: Univariate GARCH Modeling

- Page 212. In the equations for the alternative formulation of the ARCH model, the symbols for ε are made consistent.
- Page 218. Equation (7.10) giving the log-likelihood function should have $\frac{1}{2}$ multiplying the last term:

$$\log L = -\frac{1}{2} \log(2\pi) - \frac{1}{2} \sum_{t=1}^T \log \sigma_t^2 - \frac{1}{2} \sum_{t=1}^T \frac{\varepsilon_t^2}{\sigma_t^2}$$

(Added January 4, 2005. Error found by Paul Lasky)

Chapter 8: Long Memory Time Series Modeling

1. Page 262. After equation (8.7), $s_T = \sqrt{1/T \sum_{i=1}^T (y_i - \bar{y})^2}$ is not the sample standard deviation. It is a consistent estimate of $\sqrt{\text{var}(y_i)}$. (Added January 3, 2005)
2. Page 294. Sec. 8.7.2, 3rd Paragraph: "n.predcit" should read "n.predict". (Added January 4, 2005. Error found by Paul Lasky.)

Chapter 9: Rolling Analysis of Time Series

1. Page 302. The rolling means start out around 5%, fall close to 0% in 1994, rise again to about 5% until 2000 and then fall below 0%. (Added January 3, 2005. Error found by Ed Fleth.)
2. Page 336. Delete extraneous “(“ from formula for $RMSE(h)$
3. Page 336. Delete extraneous equation number.

Chapter 10: Systems of Regression Equations

1. Page 351, Feasible GLS Estimation. The second sentence should be “However, in the SUR model the elements of Σ can be consistently estimated by least squares estimation of (10.5) equation by equation using ...” (Added January 3, 2005.)
2. Page 357. In the creation of the “SUR” object `sur.fit2`, add the optional argument `df=3` so that the residual covariance matrix is computed using the sample size as the common divisor. This will ensure that the iterated SUR estimator is numerically equivalent to the MLE. The numerical results will change slightly, and should be

```
> cbind(coef(sur.fit), coef(sur.fit2))
              [, 1]          [, 2]
(Intercept) -0.0031206285 -0.0031173669
USCN.FP.lag1 -1.6625589727 -1.6600931311
(Intercept)  0.0005839823  0.0004052122
USDM.FP.lag1  0.5095659037  0.6206957559
(Intercept)  0.0013332728  0.0013272214
USFR.FP.lag1  1.0151208149  1.0120465820
(Intercept) -0.0005878941 -0.0008355304
USIL.FP.lag1  0.4617399286  0.4093040194
(Intercept)  0.0077891798  0.0074964633
USJY.FP.lag1 -1.7641619038 -1.6582034986
(Intercept) -0.0035494748 -0.0033678664
USUK.FP.lag1 -1.2962586900 -1.2084398827
```

(Added January 3, 2005. Error found by Urs Schweri)

3. Page 359. In the creation of the “SUR” object `sur.fit2r`, add the optional argument `df=3` so that the residual covariance matrix is computed using the sample size as the common divisor. This will ensure that the iterated SUR estimator is numerically equivalent to the MLE. The numerical results will change slightly, and should be

Seemingly Unrelated Regression:

$$\text{Eq. 1: } (\text{USCNS.diff} - \text{USCN.FP.lag1}) \sim 1$$

Coefficients:
(Intercept)
0.0004

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.014

$$\text{Eq. 2: } (\text{USDMS.diff} - \text{USDM.FP.lag1}) \sim 1$$

Coefficients:
(Intercept)
-0.0002

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.0359

$$\text{Eq. 3: } (\text{USFRS.diff} - \text{USFR.FP.lag1}) \sim 1$$

Coefficients:
(Intercept)
0.0013

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.0347

$$\text{Eq. 4: } (\text{USILS.diff} - \text{USIL.FP.lag1}) \sim 1$$

Coefficients:
(Intercept)
0.002

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.0333

Eq. 5: (USJYS.diff - USJY.FP.lag1) ~ 1

Coefficients:
(Intercept)
0.0002

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.0367

Eq. 6: (USUKS.diff - USUK.FP.lag1) ~ 1

Coefficients:
(Intercept)
0.0012

Degrees of freedom: 215 total; 214 residual
Time period: from Aug 1978 to Jun 1996
Residual scale estimate: 0.0353

Log determinant of residual covariance: -47.6396

(Added January 3, 2005. Error found by Urs Schweri)

4. Page 360. After the above changes, the LR statistic should now be

```
> LR = nobs*(determinant(sur.fit2r$Sigma, log=T)$modulus-  
+ determinant(sur.fit2$Sigma, log=T)$modulus)  
> as.numeric(LR)  
[1] 42.91024  
> 1-pchisq(LR, 6)  
[1] 1.215124e-007
```

(Added January 3, 2005. Error found by Urs Schweri)

5. Page 368. With the above changes, the LR statistic becomes

```
> LR = nobs*(determinant(nlsur.fit$Sigma, log=T)$modulus  
+ -determinant(sur.fit2$Sigma, log=T)$modulus)  
> as.numeric(LR)  
[1] 34.47646  
> 1 - pchisq(LR, 6)  
[1] 5.442154e-006
```

(Added January 3, 2005. Error found by Urs Schweri)

1. Page 382. The object `var.coef` is used but not defined:
`vecPi=as.vector(var.coef)`. The line should be:

```
> vecPi = as.vector(var1.fit$coef)
```

(Added March 16, 2005)

2. Page 392. The missing code to fit the VAR(2) model is

```
> var2.fit = VAR(cbind(dspot, fp)~ar(2), data=uscn.ts)
```

Also, the restriction matrix for the Granger Causality test should be

```
> R = matrix(c(0,0,1,0,0,0,0,0,0,0,
+             0,0,0,0,1,0,0,0,0,0),
+           2,10,byrow=T)
```

The test statistic and p-value change to

```
> wald
      [,1]
[1,] 8.468844
> 1-pchisq(wald,2)
[1] 0.01448818
```

and indicate a fairly strong rejection of the null that *fp* does not Granger-Cause Δs
 (Added February 22, 2005. Error found by Frank Hansen)

3. Page 394. Eliminate duplicate “+” in last formula on page

Chapter 12: Cointegration

1. Page 435. In equation (12.18) the “j” subscripts in the expanded equation should not be there. The corrected equation should be

$$\begin{aligned} & \gamma D_t + \beta_2' Y_{2t} + \psi_p' \Delta Y_{2t+p} + \dots + \psi_1' \Delta Y_{2t+1} \\ & + \psi_0' \Delta Y_{2t} + \psi_{-1}' \Delta Y_{2t+1} + \dots + \psi_{-p}' \Delta Y_{2t-p} + u_t \end{aligned}$$

(Added March 16, 2005. Error found by Frank Hansen)

2. Page 440. In equation (12.21), change **y** to **Y** on RHS of formula.
3. Page 440. In the line below equation (12.21) change Γ_k to bold type.
4. Page 440. In the middle of the line after equation (12.22), “exit” should be “exist”.

Chapter 13: Multivariate GARCH Modeling

Chapter 14: State Space Models

1. Page 511. The LHS of equation (14.26) should read " β_{t+1} ".
2. Page 511. After equation (4.26), replace "k" with " κ "

Chapter 15: Factor Models for Asset Returns

1. Page 553. The degrees of freedom used to compute the R^2 for the macroeconomic factor model should be $N - 3$. The correct code is

```
> r.square = 1 - (n.obs - 3) *  
+           diagD.hat/diag(var(returns, SumSquare=T))
```

Chapter 16: Term Structure of Interest Rates

Chapter 17: Robust Change Detection