

# Errata for *Modeling Financial Time Series with S-PLUS, Second Edition*

Eric Zivot and Jiahui Wang

December 28, 2005  
Updated: September 5, 2007

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

1. July 3, 2007. Page 16. The units information in the “timeSeries” object `singleIndex.dat` should be

```
> singleIndex.dat@units  
[1] "Price per share"
```

Error found by Pym Manopimoke.

2. July 5, 2007. Page 48. To get the correct results for the multiperiod discrete returns example, add the following line of code before the call to `aggregateSeries`:

```
> ret.d = getReturns(singleIndex.dat,type="discrete")
```

Error found by Pym Manopimoke.

## Chapter 3: Time Series Concepts

1. March 28, 2006: Page 102, Example 16. In S-PLUS 7, the function `colMeans` has a method for `timeSeries` objects and so the extractor function `seriesData` is not required to extract the data slot for the variable `Y`. Hence, the means may be computed using `colMeans(Y)`. Error found by Jagrata Minardi.
2. July 9, 2007. Page 91, top of page. The sentence starting “For this model” should be “For these models”
3. July 9, 2007. Page 91, Example 10. In the function `varRatioTest`, the argument `x` is the log price series not the log return series.

## Chapter 4: Unit Root Tests

1. July 5, 2007. Page 124. There was a bug in the `unitroot` function when computing the ADF normalized bias statistic when the lag length is greater than 2 that was fixed in FM 2.0. The correct output for the example on the bottom of the page is

Test for Unit Root: Augmented DF Test

Null Hypothesis: there is a unit root

Type of Test: normalized test

Test Statistic: -4.701

P-value: 0.4608

Coefficients:

lag1 lag2 constant

-0.0214 -0.1047 -0.0058

Degrees of freedom: 243 total; 240 residual

Time period: from Apr 1976 to Jun 1996

Residual standard error: 0.01378

Error found by Pym Manopimoke.

2. July 5, 2007. Page 136. The objects `ers`, `dfgls` and `mpp` should be named `ers.test`, `dfgls.test` and `mpp.test`, respectively. Error found by Pym Monopimoke.

## Chapter 5: Modeling Extreme Values

1. July 3, 2007. Page 151 (middle of page). The sentence after the parameter estimates of the GEV distribution should be “The MLE for  $\xi$  is 0.334 with asymptotic standard error  $\widehat{SE}(\hat{\xi}) = 0.208$ .” The word “error” was missing. Typo found by Drew Creal.
2. July 3, 2007. Page 151 (middle of page). “considerably” should be “considerable”. Typo found by Drew Creal.
3. July 5, 2007. Page 145. Equation (5.4) should be

$$\Pr\{M_n < x\} \approx H_\xi \left( \frac{x - \mu_n}{\sigma_n} \right) = H_{\xi, \mu_n, \sigma_n}(x)$$

4. July 5, 2007. Page 156. Figure 5.8 should be Error found by Pym Manopimoke.

## Chapter 6: Time Series Regression Modeling

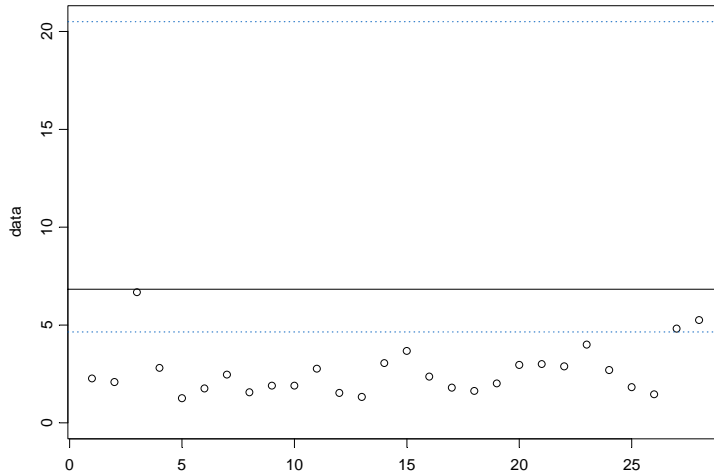


Figure 1: Estimated 40-year return level with 95% confidence band for the S&P 500 daily negative returns.

1. July 5, 2007. Page 205. The information criteria computed by the generic `S+FinMetrics` function `IC` for the dynamic OLS regression in equation (6.11) are

$$\begin{aligned} \text{AIC}(q) &= -2 \ln L(\hat{\boldsymbol{\theta}}_{OLS}) + 2p \\ \text{BIC}(q) &= -2 \ln L(\hat{\boldsymbol{\theta}}_{OLS}) + \ln(T)p \\ \text{HQ}(q) &= -2 \ln L(\hat{\boldsymbol{\theta}}_{OLS}) + 2 \ln(\ln(T))p \end{aligned}$$

where  $\hat{\boldsymbol{\theta}}_{OLS} = (\hat{\alpha}_{OLS}, \hat{\boldsymbol{\beta}}'_{OLS})'$ .

2. July 5, 2007. Page 206, Example 37. The output for this example should be

```
> IC(dl.fit,type="AIC")
[1] -1284.94
> IC(dl.fit,type="BIC")
[1] -1248.75
> collinearTest(dl.fit,method="cn")
[1] 314.2767
> collinearTest(dl.fit,method="vif")
      FFR tslag(FFR, 1:12)lag1 tslag(FFR, 1:12)lag2
116.7616          291.8807          304.2501
```

```

tslag(FFR, 1:12)lag3 tslag(FFR, 1:12)lag4 tslag(FFR, 1:12)lag5
      316.7899           344.8105           356.6562

tslag(FFR, 1:12)lag6 tslag(FFR, 1:12)lag7 tslag(FFR, 1:12)lag8
      387.6001           388.7266           402.9039

tslag(FFR, 1:12)lag9 tslag(FFR, 1:12)lag10 tslag(FFR, 1:12)lag11
      411.4048           420.7615           429.3524

tslag(FFR, 1:12)lag12
      167.6447

```

Error found by Pym Manopimoke.

3. July 5, 2007. Page 208, Example 38. The output for this example should be

Call:

```

OLS(formula = diff(log(GDP)) ~pdl(FFR, d = 2, q = 12), data =
policy.dat, na.rm = T, start = "Jan 1990", in.format =
"%m %Y")

```

Coefficients:

```

(Intercept) pdl(FFR, d = 2, q = 12)FFR.PDL0
  0.0006      -0.0110

```

```

pdl(FFR, d = 2, q = 12)FFR.PDL1 pdl(FFR, d = 2, q = 12)FFR.PDL2
  0.0041                          -0.0003

```

```

Degrees of freedom: 98 total; 94 residual
dropped 1 cases due to missing observations.
Time period: from Jan 1990 to Feb 1998
Residual standard error: 0.0003364084

```

Also, in the sentence after the output, “compute” should be “computes”. Error found by Pym Manopimoke.

4. July 5, 2007. Page 215, Example 40. There are two extra variables in the “timeSeries” object `shiller.annual`. The full set of column id’s are

```

> colIds(shiller.annual)
[1] "price"          "dividend"       "earnings"
[4] "cpi"            "real.price"     "real.dividend"
[7] "real.earnings" "pe.10"          "dp.ratio"
[10] "dp.yield"

```

Error found by Pym Manopimoke.

- July 5, 2007. Page 217, Example 40. The Newey-West standard errors and t-statistics should be

Coefficients:

	Value	Std. Error	t value	Pr(> t )
(Intercept)	5.7414	1.1806	4.8630	0.0000
tslag(ln.dpratio)	1.5604	0.4161	3.7501	0.0005

Error found by Pym Manopimoke.

## Chapter 7: Univariate GARCH Modeling

- April 20, 2007: Page 263. Equation (7.20) should be

$$E_T[\sigma_{T+k}^2] = a_0 \sum_{i=0}^{k-2} (a_1 + b_1)^i + (a_1 + b_1)^{k-1} E_T[\sigma_{T+1}^2]$$

Error found by Ricardo Suganuma.

- April 20, 2007: Section 7.8, GARCH Model Simulation. A bug in the `S+FinMetrics` `garch` function for PGARCH models with  $d = 1$  erroneously sets the `model$power.value` component of a “`garch`” object to 2 instead of the correct value of 1. In order to replicate the results in Figure 7.16, the “`garch`” object `hp.pgarch` must be modified as follows

```
> hp.pgarch$model$power.value=1
```

before calling the `simulate` function. Error found by Krista Kilmer.

- July 6, 2007. Pages 235, 236, 249, 252, 254. There was a bug in the function `summary.mgarch` that incorrectly computed the two-sided p-values in the summary output for “`garch`” objects. This bug was corrected in FM 2.0. The correct p-values for the examples are:

Page 235-236

```
> summary(ford.mod11)
```

Estimated Coefficients:

```
-----
```

	Value	Std.Error	t value	Pr(> t )
C	7.708e-004	3.763e-004	2.049	0.0406245
A	6.534e-006	1.745e-006	3.744	0.0001863
ARCH(1)	7.454e-002	5.362e-003	13.902	0.0000000
GARCH(1)	9.102e-001	8.762e-003	103.883	0.0000000

Page 249

```
> summary(ford.2comp)
Estimated Coefficients:
```

```
-----
              Value Std.Error t value  Pr(>|t|)
      C 6.870e-004 3.795e-004   1.810 7.038e-002
      A 1.398e-006 5.877e-007   2.379 1.743e-002
ALPHA(1) 2.055e-002 6.228e-003   3.300 9.851e-004
ALPHA(2) 1.422e-001 2.532e-002   5.617 2.219e-008
  BETA(1) 9.664e-001 8.637e-003 111.883 0.000e+000
  BETA(2) 3.464e-001 1.091e-001   3.175 1.523e-003
```

Page 252

```
> summary(hp.gmean)
Estimated Coefficients:
```

```
-----
              Value Std.Error t value  Pr(>|t|)
      C -0.001712 0.0013654  -1.254 2.100e-001
ARCH-IN-MEAN 4.373185 2.8699424   1.524 1.277e-001
      A  0.001648 0.0003027   5.444 5.839e-008
  ARCH(1) 0.093854 0.0096380   9.738 0.000e+000
  GARCH(1) 0.853787 0.0176007  48.509 0.000e+000
  LEV(1) -0.161515 0.0648241  -2.492 1.280e-002
```

Page 254

```
> summary(ford.beta)
Estimated Coefficients:
```

```
-----
              Value Std.Error t value  Pr(>|t|)
      C 8.257e-005 3.063e-004   0.2695 7.875e-001
      MA(1) 4.448e-002 2.186e-002   2.0348 4.201e-002
seriesData(nyse.s) 1.234e+000 2.226e-002  55.4418 0.000e+000
      A 1.406e-006 5.027e-007   2.7971 5.207e-003
  ARCH(1) 3.699e-002 4.803e-003   7.7019 2.087e-014
  GARCH(1) 9.566e-001 6.025e-003 158.7691 0.000e+000
```

```
> summary(dell.mod)
Estimated Coefficients:
```

```
-----
              Value Std.Error t value  Pr(>|t|)
      C 0.15678  0.06539   2.3977 0.01664242
```

```

          A -0.02078    0.03927   -0.5293  0.59671440
    ARCH(1) 0.14882    0.03721    3.9992  0.00006728
    GARCH(1) 0.95140    0.01695   56.1226  0.00000000
seriesData(d.volume) 1.39898    0.08431   16.5928  0.00000000

```

## Chapter 8: Long Memory Time Series Modeling

1. July 6, 2007. Page 283. There was a bug in the function `d.pgram` when `method="\l1"`. The correct output should be

```

> H.11
[1] 0.37696

```

## Chapter 9: Rolling Analysis of Time Series

1. July 6, 2007. Page 322. The line

```

> smp1 = positions(ret.ts)>=start(roll.cor)

```

should come after the call to `roll.cor` and before the call to the `par` function to set the graphics parameters.

2. July 6, 2007. Page 325, Example 51. The code to compute the outlier data was omitted from the book and so graph for Example 51 cannot be computed. The code to simulate and plot the outlier data is

```

# outlier example data
> set.seed(667)
> e = rnorm(100)
> e[20] = 10
> roll.mean = SMA(e,n=10,trim=F)
> roll.sd = sqrt(rollVar(e,n=10,trim=F))
> par(mfrow=c(2,1))
> tsplot(e)
> tsplot(roll.mean,roll.sd)
> legend(75,3,legend=c("Rolling mean","Rolling sd"),
> lty=1:2)

```

Error found by Pym Manopimoke.

3. July 6, 2007. Page 336, Example 53. The output of `roll.adf` (for `norm.bias`) and the graph for the normalized bias in Figure 9.12 are incorrect due to a bug in the function `unitroot`. The correct output is

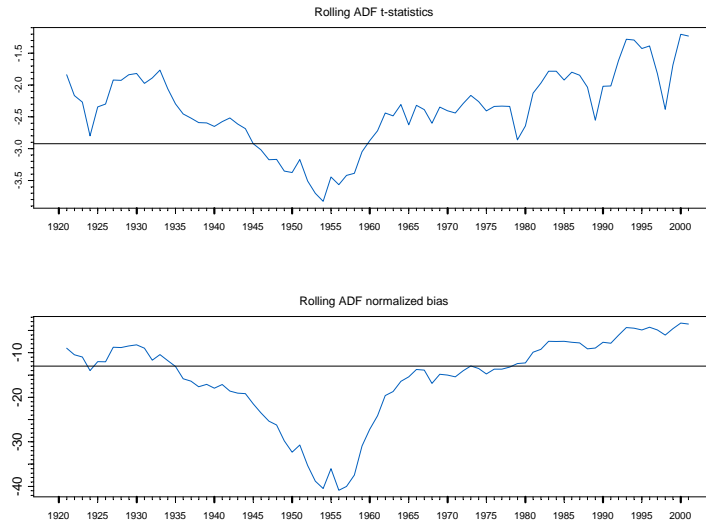


Figure 2: 50 year rolling ADF t-statistics and normalized bias statistics for the S&P 500 dividend-price ratio.

```
> roll.adf[1:3,]
Positions t.test norm.bias
1920      -1.840  -8.977
1921      -2.168 -10.424
1922      -2.270 -10.973
```

and the correct graph for Figure 9.12 is Error found by Pym Manopimoke.

4. July 6, 2007. Page 355, Example 56. The output format of the “timeSeries” object `shiller.annual` only displays the year. As a result, the output on the top of page 355 should be

```
> start(stock.ts)
[1] 1881
> end(stock.ts)
[1] 2000
```

Typo found by Pym Manopimoke.

## Chapter 11: Vector Autoregressive Models for Multivariate Time Series

1. April 6, 2007: Page 424, second line. “requires” should be “requires”. Error found by Ricardo Sukanuma.



2. July 6, 2007. Section 11.5. Throughout the example, the “VAR” object should be called `varAIC.out` and not `varAIC.fit`. Typo found by Pym Manopimoke.

## Chapter 12: Cointegration

1. September 4, 2007. Page 466. As the result of a bug fix in the print method, the output from the restricted model should be

```
> print(restr.mod2, restrictions = T)
```

Call:

```
coint(Y = johansen.danish[, c(1, 2, 4, 5)], trend = "rc", b = b)
```

Trend Specification:

H1\*(r): Restricted constant

Tests for Known Coint Vectors:

Null hypothesis: the restriction is true

	Stat	Dist	df	P-value
H(1)	29.6915	chi-square	4	0.0000
H(2)	8.3659	chi-square	3	0.0390
H(3)	4.8802	chi-square	2	0.0872
H(4)	0.5859	chi-square	1	0.4440

## Chapter 13: Multivariate GARCH Modeling

1. July 6, 2007. Page 503. The coefficients for the multivariate principle component PGARCH(1,1,1) should be

Coefficients:

C(1)	-0.00050983
C(2)	-0.00006261
A(1, 1)	0.00172970
A(2, 2)	0.00034542
ARCH(1; 1, 1)	0.10436578
ARCH(1; 2, 2)	0.05739750
GARCH(1; 1, 1)	0.84688437
GARCH(1; 2, 2)	0.92503065

Error found by Pym Manopimoke

2. July 6, 2007. Page 511. The plot in Figure 13.10 was produced using the command

```
> plot(hp.ibm.pred, ask=F, which.plot=2, layout=c(1,2))
```

## Chapter 14: State Space Models

1. December 28, 2005: Pages 532, Table 14.3. The `seasonalDummy` component has two elements:  $\sigma_\omega$  and  $s$ .
2. December 28, 2005: Page 533, Example 95. Change  $\sigma_\eta = 1$  to  $\sigma_\eta = 0.5$ . Also, (14.14) should be (14.12).
3. July 6, 2007. Page 527. The data in the `mX` component of `ssf.tvp.capm` should be

```
$mX:
```

```
numeric matrix: 131 rows, 2 columns.
```

```
      SP500
1 1  0.002839
2 1  0.017855
...
131 1 -0.0007466
```

Error found by Pym Manopimoke.

4. July 6, 2007. Page 542, Figure 14.2. Because the data in the `mX` component of `ssf.tvp.capm` was incorrect, the data in Figure 14.2 is slightly different. The correct graph is given below
5. July 6, 2007. Page 564, last line. `sv.mle2` should be `sv.mle`. Error found by Pym Manopimoke.

## Chapter 15: Factor Models for Asset Returns

1. August 23, 2006. Page 571, Equation (15.4) should be

$$\mathbf{R}_{(N \times T)} = \mathbf{\alpha} \mathbf{1}'_{(N \times T)} + \mathbf{B}_{(N \times K)} \mathbf{F}_{(K \times T)} + \mathbf{E}_{(N \times T)}$$

2. September 4, 2007. Page 588. The correlation matrix for the industry factor model should be

```
> print(cor.ind,digits=1,width=2)
      CITCRP  CONED  CONTIL  DATGEN  DEC  DELTA  GENMIL  GERBER
CITCRP    1.0    0.4    0.2    0.3 0.3    0.2    0.5    0.4
  CONED    0.4    1.0    0.2    0.3 0.3    0.2    0.5    0.4
CONTIL    0.2    0.2    1.0    0.2 0.2    0.3    0.2    0.1
```

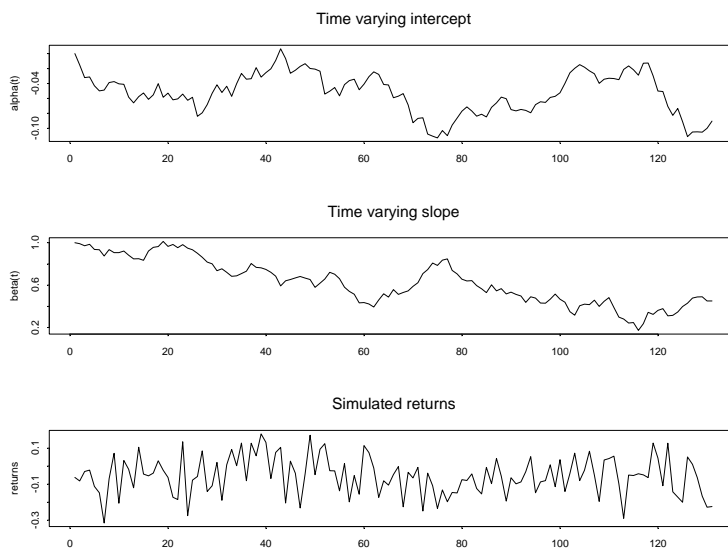


Figure 3: Simulated state and response values from the CAPM with time varying parameters state space form `ssf.tvp`.

DATGEN	0.3	0.3	0.2	1.0	0.6	0.3	0.3	0.2
DEC	0.3	0.3	0.2	0.6	1.0	0.3	0.3	0.3
DELTA	0.2	0.2	0.3	0.3	0.3	1.0	0.2	0.2
GENMIL	0.5	0.5	0.2	0.3	0.3	0.2	1.0	0.4
GERBER	0.4	0.4	0.1	0.2	0.3	0.2	0.4	1.0
IBM	0.3	0.3	0.2	0.6	0.6	0.3	0.3	0.3
MOBIL	0.2	0.2	0.3	0.3	0.3	0.4	0.2	0.2
PANAM	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.2
PSNH	0.3	0.3	0.1	0.2	0.2	0.2	0.3	0.3
TANDY	0.3	0.3	0.2	0.5	0.6	0.3	0.3	0.2
TEXACO	0.2	0.2	0.3	0.3	0.3	0.4	0.2	0.2
WEYER	0.4	0.4	0.2	0.3	0.3	0.2	0.4	0.4

3. September 4, 2007. Page 588. The minimum variance portfolio for the industry factor model should be

```
> t(w.gmin.ind)
  CITCRP  CONED  CONTIL  DATGEN      DEC  DELTA  GENMIL
[1,] 0.1401 0.1549 0.02605 0.005638 0.008182 0.0605 0.1615

  GERBER      IBM  MOBIL  PANAM  PSNH      TANDY
[1,] 0.0893 0.007214 0.07763 0.03213 0.047 0.004635
```

TEXACO WEYER  
[1,] 0.07469 0.1105

- September 4, 2007. Page 603. Due to a bug fix in the `mfactor` function, the regression  $R^2$  values for the 2-factor model should be

Regression R-squared:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.03115	0.21376	0.42668	0.39799	0.57334	0.92541

- September 4, 2007. Page 608. Due to a bug fix in the `mfactor` function, the regression  $R^2$  values for the `folio.dat` data should be

Regression R-squared:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.06603	0.26169	0.34991	0.36899	0.45567	0.94296

- September 4, 2007. Page 614. Due to a bug fix in the `mfactor` function, the regression  $R^2$  values should be

Regression R-squared:

Min.	1st Qu.	Median	Mean	3rd Qu.	Max.
0.000	0.121	0.185	0.203	0.264	0.833

## Chapter 18: Nonlinear Time Series Models

- March 28, 2006. Page 703, line 11. In the equation,  $\delta_t$  should be  $\delta_{S_t}$ .

## Chapter 19: Copulas

- March 30, 2008. Pages 714, 728, 732, 748, and 758. “Nelson” should be “Nelsen”. Error found by Pedro Morettin.
- March 30, 2008. Pages 728 and 729. The equations for  $\lambda_u(X, Y)$  and  $\lambda_l(X, Y)$  are missing a closing “)”. The expressions should be

$$\begin{aligned}\lambda_u(X, Y) &= \lim_{q \rightarrow 1} \Pr(Y > \text{VaR}_q(Y) | X > \text{VaR}_q(X)) \\ \lambda_l(X, Y) &= \lim_{q \rightarrow 0} \Pr(Y \leq \text{VaR}_q(Y) | X \leq \text{VaR}_q(X))\end{aligned}$$

Error found by Pedro Morettin.

- March 30, 2008. Pages 736, 737, 741, and 746. In the code examples, replace `normal.cop.7` with `ncop.7`. Error found by Pedro Morettin.

## Chapter 21: GMM

1. December 28, 2005: Page 794, Section 21.3.2 *Serially Correlated Moments*. The HAC estimate of  $\mathbf{S}$  should be

$$\hat{\mathbf{S}}_{HAC} = \hat{\mathbf{\Gamma}}_0(\hat{\boldsymbol{\theta}}) + \sum_{j=1}^{n-1} w_{j,n}(\hat{\mathbf{\Gamma}}_j(\hat{\boldsymbol{\theta}}) + \hat{\mathbf{\Gamma}}_j'(\hat{\boldsymbol{\theta}}))$$

2. October 18, 2006: Page 790, first line.  $\mathbf{I}_k$  should be  $\mathbf{I}_K$ ; Page 790, second line.  $\mathbf{X}$  is  $n \times K$ . Page 790, Continuous Updating Estimator, line 5.  $\mathbf{S}(\delta)$  should be  $\hat{\mathbf{S}}(\delta)$ . Page 793, last line before Section 21.3. “ $J$  statistics” should be “ $J$  statistic”.
3. September 5, 2007: Page 804. The output of the 2-step GMM estimator should be

Coefficients:

	Value	Std.Error	t value	Pr(> t )
GY	0.6277	0.1761	3.5645	0.0012
R3	-0.0099	0.1156	-0.0856	0.9323
const	0.0071	0.0041	1.7423	0.0911

Test of Overidentification:

J-stat	Df	P.value
1.5785	1	0.209

Optimization Info:

Number of Iterative Steps: 2

Error found by Pym Manopinoke.

## Chapter 22: Semiparametric Conditional Density Models

1. March 28, 2006: Page 848, line 6. “coupla” should be “copula”. Error found by Jagrata Minardi.

## Chapter 23: Efficient Method of Moments

1. March 28, 2006. Page 954, Section 23.4.2, Data. “Figure ??” should be “Figure 22.18”. Error found by Guy Yollin.