Errata for Mathematics and Statistics for Financial Risk Management

If you have questions or wish to report additional errors please e-mail mike@risk256.com .

Chapter 3, Sample problem, p48

The continuous interest rate is 5%. In the last equation, 0.5 should be 0.05. The final answer, \$80.85, is still correct.

Current text:

$$E[V_t] = e^{-0.5}E[V_{t+1}] = e^{-0.5}\$85 = \$80.85$$

Should be:

$$E[V_t] = e^{-0.05}E[V_{t+1}] = e^{-0.05}\$85 = \$80.85$$

Chapter 3, Sample problem, p 50-51

The final answer on page 51 should be 621, not 741.

Current text:

E[*y*] = 12 + 16 · 9 + 85 ·4 + 125 = 741

Should be:

E[*y*] = 12 + 16 · 9 + 85 ·4 + 125 = 621

Chapter 3, Skewness and Kurtosis, p62 and p66

The formulas for skewness and kurtosis when the mean is known, Equations 3.42 and 3.47, are missing a 1/*n* term.

Current formulas:

$$\hat{s} = \sum_{i=1}^{n} \left(\frac{x_i - \mu}{\sigma}\right)^3$$

$$\widehat{K} = \sum_{i=1}^{n} \left(\frac{x_i - \mu}{\sigma}\right)^3$$

Correct formulas:

$$\hat{s} = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i - \mu}{\sigma}\right)^3$$

$$\widehat{K} = \frac{1}{n}\sum_{i=1}^{n}\left(\frac{x_i - \mu}{\sigma}\right)^4$$

Chapter 3, Coskewness and Cokurtosis, p67

Current text:

" The third and fourth cross central moments are referred to as coskewness and cokurtosis, respectively."

The word "standardized" was omitted. As with skewness and kurtosis, coskewness and cokurtosis are standardized by the corresponding standard deviations.

Correct text:

" The third and fourth standardized cross central moments are referred to as coskewness and cokurtosis, respectively."

Chapter 3, Coskewness and Cokurtosis, p69

Current formula:

$$\mu_{AAB} = E[(A-\mu_A)^2(B-\mu_B)]$$
$$\mu_{ABB} = E[(A-\mu_A)(B-\mu_B)^2] \qquad (3.51)$$

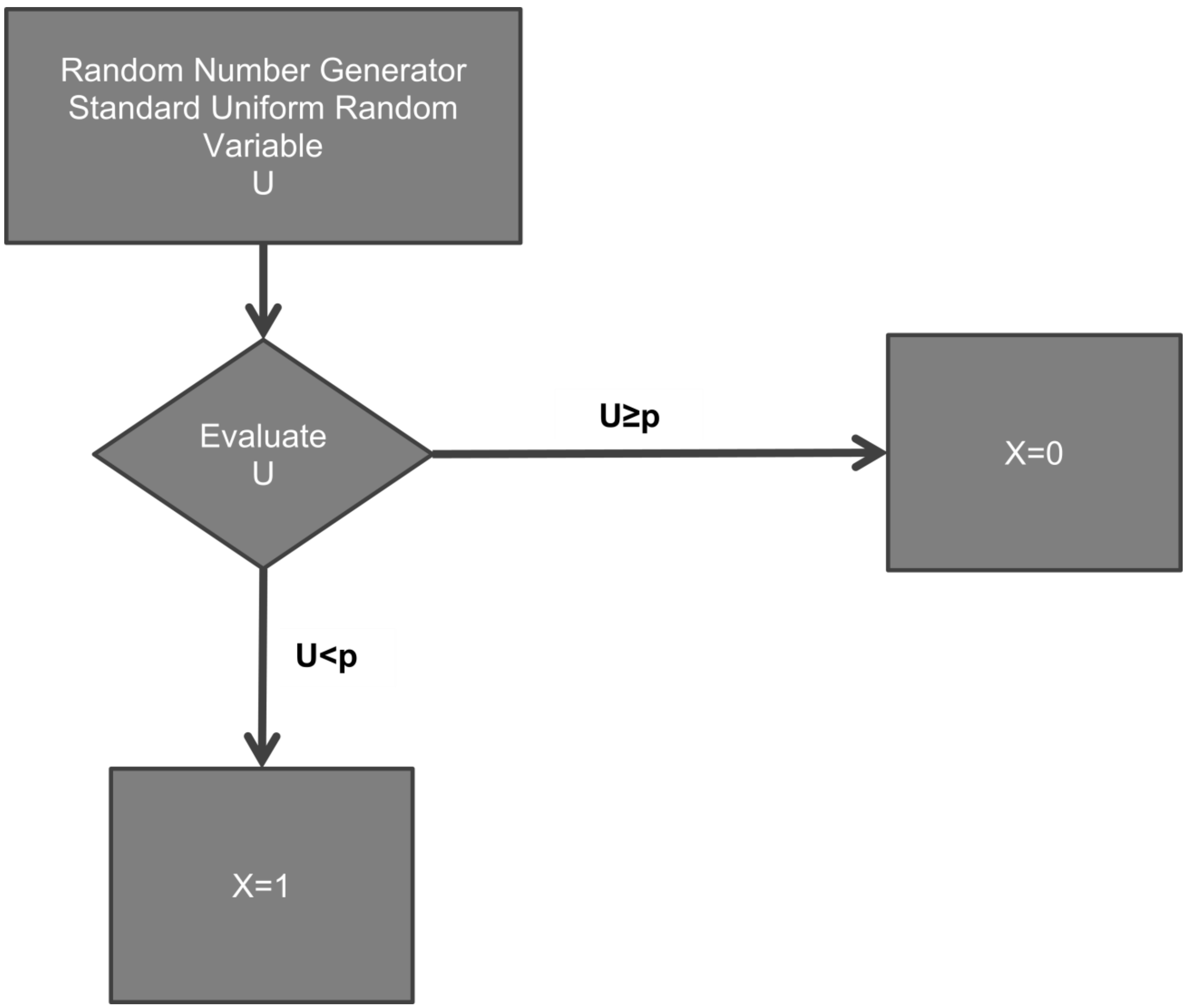
These are the correct formulas for the third cross central moments (not standardized). To be consistent with the preceding paragraph, this should have been the formulas for coskewness.

More correct formula:

$$S_{AAB} = E[(A-\mu_A)^2(B-\mu_B)]/\sigma_A^2\sigma_B$$
$$S_{ABB} = E[(A-\mu_A)(B-\mu_B)^2]/\sigma_A\sigma_B^2 \qquad (3.51)$$

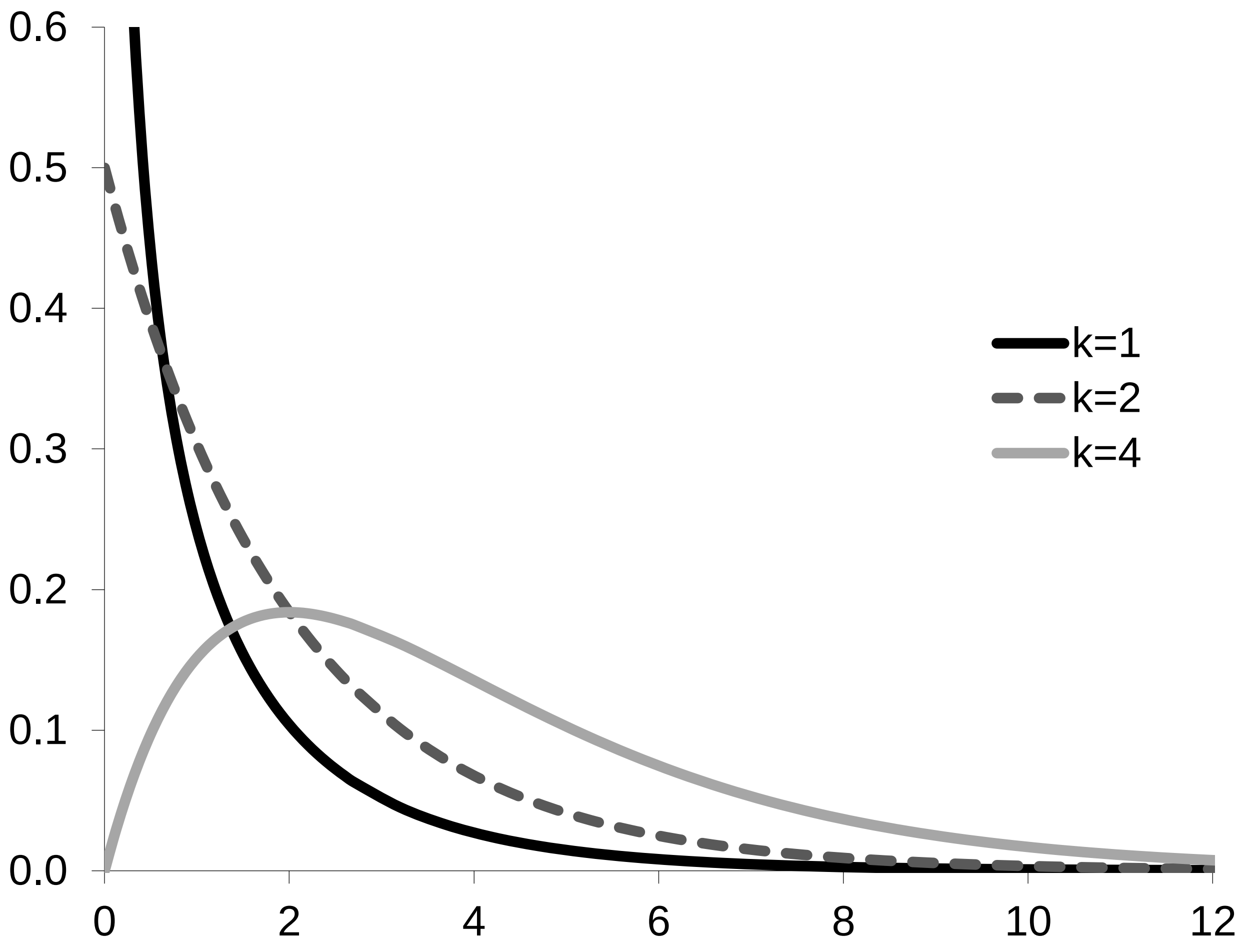
Chapter 4, Figure 4.2, p 4.2

The values X=1 and X=0 should be reversed to be consistent with the preceding text. The correct figure is:



Chapter 4, Figure 4.9, Chi Squared Probability Density Function, p 95

Correct figure:



Chapter 5, VaR, p 114

By convention, and consistent with previous sections, the right-hand side of Equation 5.15 should be α, not 1−α.

Current equation:

$$P[L \leq \mathrm{VaR}_{\alpha}] = 1 - \alpha$$

Correct equation:

$$P[L \leq \mathrm{VaR}_\alpha] = \alpha$$

Chapter 6, Equation 6.40, p 139

In the first line of the equation, the plus sign should be a minus.

Current equation:

$$Cov[c_i c_j] = E[c_i c_j] + E[c_i]E[c_j] = E[c_i c_j]$$

Correct equation:

$$Cov[c_i c_j] = E[c_i c_j] - E[c_i]E[c_j] = E[c_i c_j]$$

Chapter 8, Equation (8.9), p 177

The standard deviations in equation (8.9) are reversed.

Current equation:

$$\beta = \frac{\mathrm{Cov}[X, Y]}{\sigma_X^2} = \rho_{XY} \frac{\sigma_X}{\sigma_Y}$$

Correct equation:

$$\beta = \frac{\mathrm{Cov}[X, Y]}{\sigma_X^2} = \rho_{XY} \frac{\sigma_Y}{\sigma_X}$$

Chapter 8, Equation (8.13), p 180

Current Equation:

$$\mathrm{TSS} = \sum_{i=1}^{n} y_i^2$$

$$\mathrm{ESS} = \sum_{i=1}^{n} \hat{y}_i^2 = \sum_{i=1}^{n} (\alpha + \beta x_i)^2$$

Correct Equation:

$$TSS = \sum_{i=1}^{n} (y_i - \bar{Y})^2$$

$$ESS = \sum_{i=1}^{n} (\hat{y}_i - \bar{Y})^2 = \sum_{i=1}^{n} (\alpha + \beta x_i - \bar{Y})^2$$

Chapter 8, Equation (8.27), p 187

The equation is missing an exponent. The ε_i should be squared.

Current equation:

$$\hat{\sigma}_{\varepsilon}^{2} = \frac{\sum_{i=1}^{t} \varepsilon_i}{t-n}$$

Correct equation:

$$\hat{\sigma}_{\varepsilon}^{2} = \frac{\sum_{i=1}^{t} \varepsilon_i^2}{t-n}$$

Chapter 10, Variance, p 230

Current text:
"As with the standard estimator of the mean, it is not uncommon in finance for the mean to be close to zero and much smaller than the standard deviation of returns."

The first "mean" should be "variance"

Should be:
"As with the standard estimator of the variance, it is not uncommon in finance for the mean to be close to zero and much smaller than the standard deviation of returns."

Chapter 10, Variance, p 231:

Current text:
"It is not too difficult to prove that in the limit, as δ approaches one – that is, as our estimator becomes a rectangular window – *A* approaches 1/*n* and *B* converges to one. Just as we would expect, in the limit our new estimator converges to the standard variance estimator."

The above is a valid approximation for as *n* approaches infinity.

Should be:
"It is not too difficult to prove that in the limit, as δ approaches one – that is, as our estimator becomes

a rectangular window – *A* approaches 1/(*n*−1) and *B* converges to *n*/(*n*−1). Just as we would expect, in the limit our new estimator converges to the standard variance estimator."

Answers, Chapter 1, Question 11, p246

The correct answer is $76.83, as specified in the formula, not $78.83 as specified in the text.

Answers, Chapter 3, Question 4, p250

In the second line of the equation, one of the minus signs on the right-hand side of the equation should be a plus. It also may not be clear how to get from the first line of the equation to the second line.

Current version:

$$E\left[(\hat{\mu}-\mu)^2\right] = E\left[\left(\frac{1}{n}\sum_{i=1}^{n} r_i - \mu\right)^2\right]$$

$$E\left[(\hat{\mu}-\mu)^2\right] = \frac{1}{n^2}E\left[\sum_{i=1}^{n}(r_i-\mu)^2 - \sum_{i=1}^{n}\sum_{i\neq j}(r_i-\mu)(r_j-\mu)\right]$$

$$E\left[(\hat{\mu}-\mu)^2\right] = \frac{1}{n^2}E\left[\sum_{i=1}^{n}(r_i-\mu)^2\right] - \frac{1}{n^2}E\left[\sum_{i=1}^{n}\sum_{i\neq j}(r_i-\mu)(r_j-\mu)\right]$$

$$E\left[(\hat{\mu}-\mu)^2\right] = \frac{1}{n^2}n\sigma^2 - \frac{1}{n^2}(n^2-n)Cov\left[r_i, r_j\right] = \frac{1}{n^2}n\sigma^2 = \frac{\sigma^2}{n}$$

Corrected version with extra step:

$$E[(\hat{\mu}-\mu)^2] = E\left[\left(\frac{1}{n}\sum_{i=1}^{n} r_i - \mu\right)^2\right] = E\left[\left(\frac{1}{n}\sum_{i=1}^{n}(r_i-\mu)\right)^2\right]$$

$$E[(\hat{\mu}-\mu)^2] = \frac{1}{n^2}E\left[\sum_{i=1}^{n}(r_i-\mu)^2 + \sum_{i=1}^{n}\sum_{i\neq j}(r_i-\mu)(r_j-\mu)\right]$$

$$E[(\hat{\mu}-\mu)^2] = \frac{1}{n^2}E\left[\sum_{i=1}^{n}(r_i-\mu)^2\right] + \frac{1}{n^2}E\left[\sum_{i=1}^{n}\sum_{i\neq j}(r_i-\mu)(r_j-\mu)\right]$$

$$E[(\hat{\mu}-\mu)^2] = \frac{1}{n^2}\sum_{i=1}^{n} E[(r_i-\mu)^2] + \frac{1}{n^2}\sum_{i=1}^{n}\sum_{i\neq j} E\big[(r_i-\mu)\big(r_j-\mu\big)\big]$$

$$E[(\hat{\mu}-\mu)^2] = \frac{1}{n^2}\sum_{i=1}^{n} \sigma^2 + \frac{1}{n^2}\sum_{i=1}^{n}\sum_{i\neq j} 0$$

$$E[(\hat{\mu}-\mu)^2] = \frac{1}{n^2} n\sigma^2 = \frac{\sigma^2}{n}$$

Back cover (Limited to 1st run only. Possibly a collector's item.):

In first sentence of the description, "academic" should be "academics".