

Errata (Dec 2012)

Applied Data Analysis and Modeling for Energy Engineers and Scientists

By T. Agami Reddy, Springer, August 2011

Chapter 1

- Page 16, right column, 9th line: $t_c = 34.05^0$ C (not 43.05^0 C)

Chapter 2

- Page 29, Table 2.1, 6th line for “Two of each non-identical...” and “boilers”: 0-0,0-1,1-1 (not 0-0,0-1,1-0)
- Page 31, left column, 4th line, remove misplaced sentence: “ Thus, two events A and B are mutually exclusive if $p(B/A)=p(B)$ ”
- Page 32, Fig. 2.4, y-axis scale for F(x): 4/6 not 2/6
- Page 34, left column, Example 2.3.2.

$$f(x) = \int_x^0 \frac{20,000}{(x' + 100)^3} dx' = \left[-\frac{10,000}{(x' + 100)^2} \right]_x^0$$

$$\int_x^\infty \frac{20,000}{(x' + 100)^3} dx' = \left[-\frac{10,000}{(x' + 100)^2} \right]_x^\infty$$

$$p(20 < X < \infty) = \left[-\frac{10,000}{(x + 100)^2} \right]_{20}^\infty = 0.694$$

$$p(80 < X < 120) = \left[-\frac{10,000}{(x + 100)^2} \right]_{80}^{120} = 0.102$$

- Page 35, Table 2.4, first row

Income (X)	<\$40,000	\$40,000 – \$90,000	>\$90,000	
Age (Y)				Marginal Probability of Y

- Page 38, left column, Example 2.4.1” Should read “Let x be the ...”
- Page 38, right column, 3rd line from bottom: “n” not “N”
- Page 40, right column, Eq 2.37a should read: $P(x; \dots)$ instead of $p(x; \dots)$
- Page 43, left column, 13th line, should read $t = \frac{(x - \mu)}{(s / \sqrt{n})}$

- Page 43, right column, 6th line, should read “mean and standard deviation (μ, σ)”
- Page 43, right column, last row. The equation should read

$$L(X > 10) = 1 - N[\ln(10), 4.6, 1.5] = 1 - N\left[\frac{\ln(10) - 4.6}{1.5}\right] = 1 - N(-1.531) = 1 - 0.0630 = 0.937$$

- Page 44, right column Example 2.4.12, third line should read “ The exponential distribution...” and not “The Poisson distribution ...”
- Page 44, equation 2.40a, the upper limit of the integral is ∞ and not x
- Page 56, Problem 2.4. Correction to event A is “400 homes” and not 600, also additional info to solve problem: “that events A or C occur in 625 homes”
- Page 57, Problem 2.14. the pdf should be:

X	0	1	2	3	4
f(x)	0.1	0.3	0.2	0.3	0.1

- Page 57, Problem 2.16. Solve problem only for a normal distribution
- Page 58, Problem 2.22. The average life in years is $\mu = 5$

Chapter 3

- Page 80, 2nd sentence of the caption of Fig. 3.28 should read:
“The sun-path diagram is generated by computing the solar *altitude* and azimuth angles....”
- Page 86, Table 3.7. First row should read: “Number of readings n”.
- Page 86, right column, last 2 lines: “If two variables x_1 and x_2 are correlated, then the standard deviation of $y = x_1 \pm x_2$ and equation 3.25 should read: $s_y^2 = s_{x_1}^2 + s_{x_2}^2 \pm 2 \cdot \text{cov}(x_1, x_2)$
- Page 89, left column, line 9, should read $\frac{U_{\Delta T}}{\Delta T} = \pm 0.028$

Chapter 4

- Page 103, right column 5th line from bottom:
“and the standard deviation of the population mean SE_x (also referred to as SE or *standard error of the*

$$\text{mean) } SE_x = \frac{\sigma}{(n)^{1/2}} \quad 4.2$$

where n is the number of samples selected or picked. “

- Page 104, Equation 4.3 should read $s_x = \frac{\sigma}{(n)^{1/2}} \left(\frac{N-n}{N-1}\right)^{1/2}$ 4.3

- Page 105, Fig. 4.1 caption should read “Illustration of the Central Limit Theorem...”
- Page 105, Example 4.2.1, 5th line : standard deviation $\sigma = 2$ years

$$\text{last line: } s_x = \frac{2}{\sqrt{36}} = 0.33 \text{ years}$$

- Page 106, right column, 5th line from bottom, should read “that $\mu >$,” and not $\mu =$
- Page 112, Example 4.2.6: In a random sample of n=100 new residences in Scottsdale, AZ, it was found that 63 had swimming pools. Find the 95% confidence interval for the fraction of buildings which have pools.

$$\text{In this case, } n=100, \text{ while } \hat{p} = \frac{63}{100} = 0.63.$$

- Page 117, line above eq. 4.24 should read: “and MSE is the mean error sum of squares”
- Page 123, right column, 8th line from bottom, should read “is 0.648,...” and not “is 0.564,...”
- Page 126, right hand column, 8th line should read: $= 64.29 \pm 1.47$
- Page 127, Example 4.6.2, 11th line should read: $H_0 : \mu = 32$ versus $H_1 : \mu > 32$
- Page 135, Pr. 4.4, right column, 4th line from bottom, replace “Bayesian” with “Bootstrap”

Chapter 5

- Page 145, Eq. 5.7b $R^2 = 1 - (1 - R^2) \frac{n-1}{n-p}$ 5.7b

where n is the total number of observation sets , and
p is the number of model parameters (for a simple linear model, p=2).

- Page 145, Eq. 5.8a: $\text{RMSE} = \left(\frac{\text{SSE}}{n-p}\right)^{1/2}$ 5.8a

- Page 145, Eq. 5.9a $\text{CV}^* = \left\{ \frac{1}{(n-p)} \sum_{i=1}^n \left[\frac{(y_i - \hat{y}_i)}{y_i} \right]^2 \right\}^{1/2}$ 5.8d

- Page 145, Eq. 5.9a
$$MBE = \frac{\sum_{i=1}^n (y_i - \hat{y}_i)}{n - p} \quad 5.9a$$

- Page 146, left column, 17th line, should read "While df=n-p for..." instead of "While df=n-k for..."
- Page 146, Example 5.3.2 , correct results: SSR = 3390.5, and SST= 3713.88
- Page 146, Eq. 5.11 and 5.12

$$F = \frac{\text{variance explained by the regression}}{\text{variance not explained by the regression}} = \frac{SSR}{SSE} \cdot \frac{n - p}{p - 1} \quad 5.11$$

$$F = \frac{R^2}{(1 - R^2)} \cdot \frac{n - p}{p - 1} \quad 5.12$$

- Page 146, Example 5.3.3, correct results: $F = \left(\frac{3390.55}{323.3}\right) \cdot \left(\frac{33 - 2}{2 - 1}\right) = 325$

- Page 152, right column, the independent variable matrix X should be:

1	1	1	1	1	1	1	1	1
0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
0.04	0.09	0.16	0.25	0.36	0.49	0.64	0.81	1

- Page 154, right column, line 10 from top should read : "x₁ on y which is ..."
- Page 162, caption of Figure 5.20 should read "C. Residual plot of log transformed **quadratic** model"
- Page 170, Equation 5.58 should read

$$F = \frac{[SSE(RM) - SSE(FM)] / (p - m)}{SSE(FM) / (p - k)} \quad 5.58$$

where n is the number of data sets, p is the number of parameters of the FM, and m the number of parameters of the RM. If the observed F value is larger than the tabulated value of F with (n-p) and (p-m) degrees of freedom

Chapter 6

- Page 187, right column, midway, should read "... between factors A and B = $\bar{y}_{ij} - (< y > + \alpha_i + \beta_j)$ a
- Page 200, left column, 20th line should read ".. T=138 and P=28,..." and not P=18
- Page 202, left column, both tables 6.24 should be merged (caption of second table is repeat)

Chapter 7

- Page 208, Eq. 7.2, should read F_1^3 and not F_1^2

- Page 217, right column matrix should read: $f(x_1, x_2) = [x_1 \quad x_2] \begin{bmatrix} 4 & 3 \\ 3 & -8 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$

- Page 217, last equation should read
$$\mathbf{x}^T \mathbf{Q} \mathbf{x} = [x_1 \quad x_2] \begin{bmatrix} 8 & 8 \\ 8 & 8 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \end{bmatrix} = [(8x_1 + 8x_2)(8x_1 + 8x_2)] \begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

$$= 8x_1^2 + 16x_1x_2 + 8x_2^2$$

Chapter 9

- Page 259, eq. 9.4 should read: $\alpha \sum_{t=0}^{\infty} (1-\alpha)^t = \frac{\alpha}{1-(1-\alpha)} = 1$
- Page 275, left hand column, 7th line from bottom, should read $\hat{Z}_{48} = \dots = -13.95$ and not -139.5

Chapter 12

- Page 369, right hand column, line 9 from bottom: "his moving is 30%" should be: "his moving is 70%"
- Page 372: Table 12.7, under "Received Threats" column, weighting factor should be 10% (not 20%) and calculated score should be 0.2 (not 0.4)
- Page 375: left hand column, line 11 from top: should read "\$80 M" not "\$8M".
- Page 378: right column: line 13 from top: should read "false positive", not "false negative"
- Page 378: right column: line 17 from top: should read "false negative", not "false positive"
- Page 395, Pr. 12.15, 4th line from bottom, instead of \$0.015/kWh, should read \$0.10/kWh