Errata and Updates for ASM Exam MAS-I (First Edition Fifth Printing) Sorted by Page

[3/30/2021] On page xiv, on the first line of the second paragraph, the link to the tables has changed. Use the following link:

https://live-casact.pantheonsite.io/sites/default/files/2021-03/masi_tables.pdf

[12/17/2020] On page 66, replace the solution to exercise 4.30 with

Here $j = 201$ in formulas (4.3) and (4.4). $\mathbf{E}[N_j] = \mathrm{Var}(N_j) = \ln 201 = 5.3033$. We want $\Pr(N_j > 10.5)$, where we added 0.5 for a continuity correction.

$$1 - \Phi\left(\frac{10.5 - 5.3033}{\sqrt{5.3033}}\right) = 1 - \Phi(2.56) = \boxed{\mathbf{0.0119}}$$

[12/16/2020] On page 74, 6 lines below the quiz, change α_i to π_i. Also, replace the last 2 sentences on the page with

An aperiodic positive recurrent irreducible Markov chain is called *ergodic*.

And delete the footnote. In the twelfth edition of *Introduction to Probability Models*, Ross defines "ergodic" on page 233

[12/16/2020] On page 95, on the sixth line, change "Let X_n be the size of the population at time n" to "Let X_n be the size of the n^{th} generation".

[9/8/2020] On page 205, in the solution to exercise 18.9, on the last line, change 0.0018 to 0.018.

[12/27/2020] On page 208, in equation (19.2), change "$r(\mathbf{F}]$" to "system life".

[12/27/2020] On page 209, in Table 19.1 equation (19.2), change "$r(\mathbf{F}]$" to "system life".

[12/31/2020] On page 279, in exercise 24.4, on the third line, change $U_2 < cg(x)$ to $U_2 < \dfrac{f(x)}{cg(x)}$.

[1/2/2021] On page 309, on the second line of Subsection 26.2.2, delete the two 2s in the formula. It should read

$$\beta_T(x) = \begin{cases} x+1 & -1 \le x \le 0 \\ 1-x & 0 < x \le 1 \\ 0 & \text{otherwise} \end{cases}$$

[1/20/2021] On page 612, 9 lines from the bottom, change "…*odds ratio*". The odds ratio is defined…" to "…*odds*. Odds is defined…".

[1/19/2021] On page 618, in Example 45F, on the last line, change $\beta_{1j} + 0.02\beta_2$ to $\beta_{1j} + 0.02X_2$.

[1/20/2021] On page 628, in exercise 45.18, change "relative odds" to "odds ratio".

[1/20/2021] On page 629, in exercise 45.22, the fitted coefficients are impossible, since they must be monotonically non-decreasing, so Intercept(Important) should be greater than Intercept(Not important). As a simple fix, change 0.14 to −0.14.

[1/20/2021] On page 637, in the solution to exercise 45.29, change $\ln(\pi_2/\pi_1) = \ln(\pi_3/\pi_2) = -0.5 + 5\beta_1$ to $\ln(\pi_1/\pi_2) = \ln(\pi_2/\pi_3) = -0.5 + 5\beta_1$.

[1/22/2021] On page 649, in exercise 46.4, in the table, change x_1, x_2, x_3 to x_2, x_3, x_4 respectively.

[3/3/2020] On page 650, in exercise 46.5, on the eighth line, change "volumne" to "volume".

[1/22/2021] On page 659, in the solution to exercise 46.19, on the second to last line, there should be a line break between $\begin{pmatrix}2.698\\6.12\end{pmatrix}$ and $\mathbf{b}^{(1)}$.

[1/23/2021] On page 671, in exercise 47.14, the last sentence should be "Calculate the scores vector for μ and σ.

[1/23/2021] On page 672, in exercise 47.17, the fifth model should include $\mathbf{x}_1$; replace $\mathbf{x}_2$, $\mathbf{x}_3$, $\mathbf{x}_4$, $\mathbf{x}_5$ with $\mathbf{x}_1$, $\mathbf{x}_2$, $\mathbf{x}_3$, $\mathbf{x}_4$, $\mathbf{x}_5$.

[1/24/2021] On page 678, on the displayed line 8 lines from the bottom of the page, change $(\mathbf{y}-\widehat{\mathbf{y}}^T)$ to $(\mathbf{y}-\widehat{\mathbf{y}})^T$.

[3/3/2020] On page 690, in the solution to exercise 48.8, on the last line, put a minus sign before 15: $-\dfrac{(-15)(2000)}{(1500)(18)}$.

[3/17/2021] On page 697, change the last sentence of Quiz 49-1 to

Determine the lowest significance level (1%, 2%, 5%, 10%, 20%) at which the hypothesis is rejected.

[3/17/2021] On pages 697–698, there are several errors in the solution to Example 49C. Here is the correct solution:

Solution: The restriction means

$$y_i = \beta_1 + \beta_2 x_{i2} + (\beta_2 + 1)x_{i3} + \varepsilon_i$$

Collecting β_1 terms, this becomes

$$\boxed{\boldsymbol{y_i - x_{i3} = \beta_1 + \beta_2(x_{i2} + x_{i3}) + \varepsilon_i}}$$

We now compute the error sum of squares for both models. For the original 3-parameter model, the design matrix is

$$\mathbf{X} = \begin{pmatrix}1 & 1 & 2\\1 & 2 & 1\\1 & 3 & 7\\1 & 5 & 3\\1 & 7 & 4\\1 & 8 & 10\end{pmatrix}$$

The fitted parameters are

$$(\mathbf{X^T X})^{-1} = \begin{pmatrix}0.67965 & -0.08432 & -0.03280\\-0.08432 & 0.04421 & -0.02383\\-0.03280 & -0.02383 & 0.03024\end{pmatrix}$$

$$\mathbf{X^T y} = \begin{pmatrix}104.2\\714.6\\799.2\end{pmatrix}$$

$$(\mathbf{X^T X})^{-1}\mathbf{X^T y} = \begin{pmatrix}8.8184\\0.7220\\2.5378\end{pmatrix}$$

The fitted values are $\hat{y}_i = 14.61, 12.80, 28.75, 20.04, 24.03, 39.98$. The error sum of squares is $\sum(y_i - \hat{y}_i)^2 = 56.52$.

For the alternative regression, the revised variables are

$\mathbf{x_2 + x_3}$	$\mathbf{y - x_3}$
3	8.1
3	14.0
10	23.5
8	21.3
11	16.9
18	29.4

Let the revised independent variable be $\mathbf{x}^* = \mathbf{x_2} + \mathbf{x_3}$ and let the revised dependent variable be $\mathbf{y}^* = \mathbf{y} - \mathbf{x_3}$. So we are fitting $y_i^* = \beta_1 + \beta_2 x_i^*$.

The fitted parameters are

$$b_2 = \frac{\sum(x_i^* - \bar{x}^*)(y_i^* - \bar{y}^*)}{\sum(x_i^* - \bar{x}^*)^2} = \frac{186.97}{158.83} = 1.1765$$
$$b_1 = \bar{y}^* - b_2\bar{x}^* = 18.867 - 1.1765(8.8333) = 8.4743$$

Recall that the error sum of squares is the total sum of squares, $\sum(y_i^* - \bar{y}^*)^2$, minus the regression sum of squares, $\sum(\hat{y}_i^* - \bar{y}^*)^2$. Since $\hat{y}_i^* = b_1 + b_2 x_i^*$ and $\bar{y}^* = b_1 + b_2\bar{x}^*$, The regression sum of squares is $\sum b_2^2(x_i^* - \bar{x}^*)^2$. Now, $\sum(y_i^* - \bar{y}^*)^2 = 281.8133$ and $\sum(x_i^* - \bar{x}^*)^2 = 158.8333$. Therefore the error sum of squares is

$$\sum(y_i^* - \bar{y}^*)^2 - b_2^2\sum(x_i^* - \bar{x}^*)^2 = 282.8133 - 1.1771^2(158.8333) = 61.97$$

Since $n = 6$ and $p = 3$, then $n - p = 3$. Also, the number of restrictions is $q = 1$. The F statistic is

$$F_{q,n-p} = F_{1,3} = \frac{(61.97 - 56.52)/1}{(56.52/3)} = \boxed{\mathbf{0.2888}}$$

□

[12/17/2020] On page 711, in the solution to exercise 49.18, on the last line, change $F_{2,814}$ to $F_{3,814}$.

[3/17/2021] On page 714, change the last sentence of the solution to Quiz 49-1 to

So 20% is the lowest significance level at which the hypothesis is rejected.

[12/18/2020] On page 726, in exercise 51.4, in the third bullet, change x to x_2.

[3/30/2021] On page 749, in exercise 52.17II, change "all i and j" to "some i and j".

[9/27/2020] On page 761, in the solution to exercise 52.23, on the third line, change 200 to 400.

[3/30/2021] On page 773, exercise 53.14 is defective in that you are not given the size of the cell, n_5, so you cannot calculate the deviance residual.

[9/27/2020] On page 776, in the solution to exercise 53.11, on the third line, the last expression in the parentheses is incorrect. The line should read

$$C = 2\sum y_i \ln\left(\frac{\hat{y}_i}{\bar{y}}\right) = 2\left(\sum y_i \ln\hat{y}_i - (\ln\bar{y})\sum y_i\right)$$

[3/30/2021] On page 787, in the second bullet of Section 55.1, on the second line, change "cannot decrease the RSS and will almost surely increase it" to "cannot increase the RSS and will almost surely decrease it".

[11/3/2019] On page 809, in exercise 56.16, in the table, change "0firstlinestrut1" to 0.

[11/3/2019] On page 810, in exercise 56.17, in the table, change "0firstlinestrut1" to 0.

[2/27/2021] On page 811, in exercise 56.20, in the table, change the value for Y corresponding to $X_1 = 3$, $X_2 = 4$ from 4 to 5.

[12/18/2020] On page 813, in the solution to exercise 56.16, replace the final answer $\boxed{(\hat\beta_1, \hat\beta_2)}$ with $\boxed{(\hat\beta_1, \hat\beta_2) = (3, 0)}$.

[2/25/2021] On page 817, add the following paragraph right before Section 57.3:

The textbook's version of this formula omits $1/n$: the sum of the squared errors, rather than the average is used, even though in the corresponding formula for regression (equation (5.3)) the average is used.

[9/21/2020] On page 859, in exercise 62.7, in the first bullet, change "residual" to "time series".

[2/13/2021] On page 859, in exercise 62.8, on the first line, replace β_t with βt.

[3/6/2020] On page 870, in exercise 63.12, the symbol w_t is used in two different ways. Change the question to

A monthly time series x_t has seasonal differences $z_t = x_t - x_{t-12}$ that satisfy $z_t = w_t - 0.5w_{t-12}$, where the w_t are normally distributed independent random variables with mean 0 and variance 1.

Determine the lag 1 autocorrelation coefficient for z_t.

[4/8/2021] On pages 871 and 874, delete exercise 63.16 and its solution. The original exam question involved an IMA(1,1) series, and belongs in Lesson 65. Here is the question and its solution:

You fit an ARIMA(0,1,1) model to a series, resulting in $\hat\beta_1 = -0.6$. The one-step and two-step-ahead forecasts are $\hat x_{n+1|n} = \hat x_{n+2|n} = 82$.

Given $x_{n+1} = 75$, determine the updated forecast, $\hat x_{n+2|n+1}$.

(A) 75 (B) 77 (C) 79 (D) 84 (E) 86

Solution: In the differenced series, $\hat y_{n+2|n} = \hat x_{n+2|n} - \hat x_{n+1|n} = 0$. The error in the one-step ahead forecast is w_{n+1}. As a result of this error, $\hat y_{n+2|n+1} = -0.6w_{n+1}$. Also, $x_{n+1} = \hat x_{n+1|n} + w_{n+1}$. Therefore

$$\hat x_{n+2|n+1} = x_{n+1} + \hat y_{n+2|n+1} = \hat x_{n+1|n} + w_{n+1} - 0.6w_{n+1} = 82 + (-7) - 0.6(-7) = \boxed{79.2} \qquad \textbf{(C)} \quad \square$$

[3/6/2020] On page 874, in the solution to exercise 63.12, change $\beta_{12} = 0.5$ to $\beta_{12} = -0.5$.

[3/17/2021] On page 1049, on the first line, change the url to

`https://www.casact.org/exams-admissions/exam-results/past-exams-pass-marks`.

Unfortunately, pre-2011 exams are no longer available, making Sections B.1–B.12 useless. Also, all links have changed, so the direct links to each exam in the other sections are no longer valid.

[2/27/2021] On page 1156, in the solution to question 33, change 18.75 + 34.75 + 53.5 to 18.75 + 34.75 = 53.5, and change "eror" to "error".

[2/27/2021] On page 1157, at the beginning of the solution to question 35, change "Section 53.1" to "Section 53.2".

[3/30/2021] On page 1179, replace the solution to question 28 with

This situation is a nominal response situation. The log-odds given here are relative to the base category. Accordingly, we use the formulas of Section 45.2:

$$\pi_2 = \frac{e^{-0.535}}{1 + e^{-0.535} + e^{-1.489}} = \frac{0.585669}{1 + 0.585669 + 0.225598} = \boxed{0.3233} \qquad \textbf{(B)}$$

[9/27/2020] On page 1204, in the fifth column of Table C.4, change “Fal” to “Fall”.