Errata and Corrigenda for *Statistics for Chemical and Material Engineers: A Modern Approach* (Second Edition)

Last Update: May 27th, 2025

Corrections marked with a * apply only to the first printing of the second edition. They should have been corrected in the second printing!

Page, line	Current Form	Correction
*p. 31, line 13	It contains the null set {} or ∅.	It contains the **empty** set {} or ∅.
*p. 32, line 14	… contain the null set, {}…	… contain the **empty** set, {}…
*p. 32, line 24	… the probability of the null set is zero!	… the probability of the **empty** set is zero!
*p. 36, line 8	…the integral is K for a candidate function…	…the integral is K **(≠ 0)** for a candidate function…
p. 68, line 3	The critical value of t_{crit} with 7 – 1 = 6 degrees of freedom is 2.97.	The critical value of t_{crit} with 7 – 1 = 6 degrees of freedom is **2.45**.
*p. 87, line 30	… the null or empty set.	**…** the empty set.
p. 88, lines 5/6	The **union** of two sets, denoted as ∪ (U+222A), is the set that contains all elements found in both sets…	The **union** of two sets, denoted as ∪ (U+222A), is the set that contains all elements **that are found in at least one of the sets**…

Page, line	Current Form	Correction
p. 89, line 19	Luckily in many processes applications there may be…	Luckily in many **process** applications**,** there may be…
p. 91, line 1	where.	where (no period afterwards)
p. 91, line 3/4	… it will be a variable of importance such as concentration or quality.	it will be a variable of importance**,** such as concentration or quality.
*p. 95, lines 10/11	...x_i, where i = 1, 2,… as β_j, where j = 1, 2,…	**…** $\vec{x}_j$, where ***j*** = 1, 2,… as β_i, where ***i*** = 1, 2,… (*Clarifying relationships between the parameters.*)
p. 102, Equation (3.42)	$\left(\vec{y}-\hat{\vec{y}}\right)^T \mathcal{A}\hat{\vec{\beta}} = \left(\left(\mathcal{I}-\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\mathcal{A}^T\right)\vec{y}\right)^T \mathcal{A}\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{I}-\mathcal{A}\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\right)\mathcal{A}\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{A}-\mathcal{A}\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\mathcal{A}^T\mathcal{A}\right)\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{A}-\mathcal{A}\right)\hat{\vec{\beta}} = 0$	$\left(\vec{y}-\hat{\vec{y}}\right)^T \mathcal{A}\hat{\vec{\beta}} = \left(\left(\mathcal{I}-\mathcal{A}\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\mathcal{A}^T\right)\vec{y}\right)^T \mathcal{A}\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{I}-\mathcal{A}\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\mathcal{A}^T\right)\mathcal{A}\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{A}-\mathcal{A}\left(\mathcal{A}^T\mathcal{A}\right)^{-1}\mathcal{A}^T\mathcal{A}\right)\hat{\vec{\beta}}$ $= \vec{y}^T\left(\mathcal{A}-\mathcal{A}\right)\hat{\vec{\beta}} = 0$ An $\mathcal{A}$ was missing in the first line, since it is clear that $\hat{y} = \mathcal{A}\beta$.
p. 103, line 21	The value of R^2 lies between [0, 1].	The value of R^2 lies between **zero and one**.
p. 111, line 20	If desired a formal hypothesis test can be performed.	If desired**,** a formal hypothesis test can be performed.

Page, line	Current Form	Correction
*p. 114, point 7, line 1	**Examining the plots of the predicted and actual values**:	**Examining the parity plot**: *Parity plot is a potential name for such a graph.*
p. 117, line 12/13	Multicollinearity is common in experiments were the variables cannot all be independently varied, for example mixture experiments where the total sum of component fractions must total 1.	Multicollinearity is common in experiments **where** the variables cannot all be independently varied, for example**,** mixture experiments where the total sum of component fractions must total 1.
*p. 125, Equation (3.98)	$\hat{\vec{y}} = \begin{bmatrix} f\left(\vec{\beta}^{(0)};\vec{x}_1\right) \\ f\left(\vec{\beta}^{(0)};\vec{x}_2\right) \\ \vdots \\ f\left(\vec{\beta}^{(0)};\vec{x}_m\right) \end{bmatrix}$	$\hat{\vec{y}} = \begin{bmatrix} g\left(\vec{\beta}^{(0)};\vec{x}_1\right) \\ g\left(\vec{\beta}^{(0)};\vec{x}_2\right) \\ \vdots \\ g\left(\vec{\beta}^{(0)};\vec{x}_m\right) \end{bmatrix}$
*p. 126, Equation (3.102)	$\boxed{\varepsilon_i = y_i - \hat{y}_i = y_i - f\left(\vec{x}_i, \hat{\vec{\beta}}\right)}$	$\boxed{\varepsilon_i = y_i - \hat{y}_i = y_i - g\left(\vec{x}_i, \hat{\vec{\beta}}\right)}$
p. 131, line 12	Using the best model, predict the peak power at T = 50°F and T = 105°F?	Using the best model, predict the peak power at T = 50°F and T = 105°F**.**
*p. 142, line 5/6	…B = 1,344.8 °C, and C = 219.482 °C…	B = **−**1,344.8**°**C, and C = 219.482**°**C

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p. 143, Equation (3.120)	$\hat{\sigma} = \frac{1}{m-2}\left(s_y^2 - \hat{b}^2 s_x^2\right)$	$\hat{\sigma}^2 = \frac{1}{m-2}\left(s_y^2 - \hat{b}^2 s_x^2\right)$
p. 144, Equation (3.130)	$\hat{\sigma}_w = \frac{1}{m-2}\left(s_{y_w}^2 - \hat{b}_w^2 s_{x_w}^2\right)$	$\hat{\sigma}_w^2 = \frac{1}{m-2}\left(s_{y_w}^2 - \hat{b}_w^2 s_{x_w}^2\right)$
*p. 154, Equation (4.6)	$y = \beta_0 + \sum_{i=1}^{n} \beta_i x_i + \sum_{j=1}^{n} \sum_{p=j+1}^{n} \beta_{jp} x_j x_p + \ldots + \beta_{\prod_{i=1}^{k} i} \prod_{i=1}^{k} x_i$	$y = \beta_0 + \sum_{i=1}^{k} \beta_i x_i + \sum_{j=1}^{k} \sum_{p=j+1}^{k} \beta_{jp} x_j x_p + \ldots + \beta_{\prod_{i=1}^{k} i} \prod_{i=1}^{k} x_i$ *Replace all* n’*s by* k.
*p. 158, line 3	$F(0.95, 1, l^k(n_R - 1))$.	$F(1-\alpha, 1, l^k(n_R - 1))$. *More general solution.*
*p. 167, §4.5.3.3, lines 9/10	generators	defining relationships
*p. 175, line 10	$F(0.95, 1, l^k(n_R - 1))$.	$F(1-\alpha, 1, l^k(n_R - 1))$. *More general solution.*
p. 201, Equation (4.82)	$y = \beta_0 + \sum_{i=1}^{2^k} \beta_i x_i \underbrace{+\ldots+}_{\text{restliche Terme}} \beta_c L_1(x).$	$y = \beta_0 + \sum_{i=1}^{k} \beta_i x_i \underbrace{+\ldots+}_{\text{restliche Terme}} \beta_c L_1(x).$

Page, line	Current Form	Correction
p. 213, #29e (last two rows)	e) Using the reduced-order model, analyse the residuals and determine if the design assumptions are met?	e) Using the reduced-order model, analyse the residuals and determine if the design assumptions are met**.**
*p. 229, Equation 5.27	$A_Q\left(z^{-s}\right)=1+\sum_{i=1}^{Q}\alpha_{si}z^{-si}$ $B_P\left(z^{-s}\right)=1+\sum_{i=1}^{P}\beta_{si}z^{-si}$	$A_P\left(z^{-s}\right)=1+\sum_{i=1}^{P}\alpha_{si}z^{-si}$ $B_Q\left(z^{-s}\right)=1+\sum_{i=1}^{Q}\beta_{si}z^{-si}$
p. 238, Equation (5.53)	$y_t=\frac{1}{1+\alpha_1z^{-1}+\alpha_2z^{-2}+\cdots+\alpha_pz^{-p}}e_t=\sum_{i=1}^{p}\frac{\phi_i}{1+\theta_i}e_t$	$y_t=\frac{1}{1+\alpha_1z^{-1}+\alpha_2z^{-2}+\cdots+\alpha_pz^{-p}}e_t=\sum_{i=1}^{p}\frac{\phi_i}{1+\theta_iz^{-1}}e_t$
*p. 240, line 2	…process stops after q lags.	…process stops after p lags.
*p. 242, Figure 5.7		The right and left images need to be exchanged. The visual difference in this case is minimal, but there is nevertheless a difference.
*p. 242, line 11	…(right) MA(2) processes	…(right) MA(**1**) processes
p. 258, Equation (5.94)	$\hat{\vec{\theta}}-\vec{\theta}\sim\mathfrak{N}\left(0,\frac{\sigma^2\Gamma_{pq}^{-1}}{m}\right)$ $\hat{\sigma}_\varepsilon^2\approx\sigma_\varepsilon^2$	$\hat{\vec{\theta}}-\vec{\theta}\sim\mathfrak{N}\left(0,\frac{\sigma_\varepsilon^2\Gamma_{pq}^{-1}}{m}\right)$ $\hat{\sigma}_\varepsilon^2\approx\sigma_\varepsilon^2$

Page, line	Current Form	Correction
*p. 266, line 9	The noise variance, σ_e^2, is 1.0870.	The noise variance, σ_e^2, is 1.08**07**.
p. 269, line 21, Equation (5.114)	$e^{-i\omega t} = \cos(\omega t) + i\sin(\omega t)$	$e^{i\omega t} = \cos(\omega t) + i\sin(\omega t)$ *(remove the minus sign in the exponential)*
p. 274, Example 5.15, first line	*Periodogramsfor the Edmonton Temperature Series*	***Periodograms for*** *the Edmonton Temperature Series*
*p. 307, line 7/8	… at least one time delay…	… **a time delay of at least one sample** …
p. 308, Equation (6.27)	$\boxed{\hat{y}_{t+1\|t} = \left(\mathcal{I} - G_l^{-1}\right) y_t + G_l^{-1} G_p u_t}$	$\boxed{\hat{y}_{t+1\|t} = \left(\mathcal{I} - G_l^{-1}\right) y_{t+1} + G_l^{-1} G_p u_{t+1}}$ *Aligning the left- and right-hand side subscripts.*

Page, line	Current Form	Correction
*p. 311, Equation (6.31) *p. 311, line after Equation (6.31)	$t\|t-1$	<u>**$t + 1\|t$**</u> (Note both formulations are equivalent, but for consistency, we should use the corrected form.)
p. 311, Equation (6.31)	$\varepsilon_{t+1\|t}\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)=y_t-\hat{y}_{t+1\|t}$	$\varepsilon_{t+1\|t}\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)=y_{t+1}-\hat{y}_{t+1\|t}$
p. 312, Equations (6.34, 6.35, 6.37); p. 313, Equation 6.41	t (*As a subscript and without any additional numbers, that is,* u_t *would be considered, but not* u_{t-1})	$t + 1$ (*To be consistent with the new formulation given above.*)

Page, line	Current Form	Correction
p. 312, Equation (6.38)	$$\varepsilon_t\left(\vec{\theta},\hat{\vec{\theta}}\right)=\Phi_u\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)u_t + \left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_t+e_t$$	$$\varepsilon_{t+1\mid t}\left(\vec{\theta},\hat{\vec{\theta}}\right)=\Phi_u\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)u_{t+1} + \left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_{t+1}+e_{t+1}$$ (*Various alignment and clarification issues regarding* t *and* t + 1.)
p. 312, line 9; p. 312, lines 2 and 4 from the bottom; p. 313, line 4	t (*In all cases.*)	$t + 1$
p. 312, line 3 from the bottom	e_{t-1}	e_t
*p. 313, Equation (6.41)	$$\operatorname{var}\left(\varepsilon_t\left(\vec{\theta},\hat{\vec{\theta}}\right)\right)=\operatorname{var}\left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)u_t\right) + \operatorname{var}\left(\left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_t\right) + \operatorname{var}\left(e_t\right)$$	$$\operatorname{var}\left(\varepsilon_{t+1\mid t}\left(\vec{\theta},\hat{\vec{\theta}}\right)\right)=\operatorname{var}\left(\boldsymbol{\Phi_u}\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)u_{t+1}\right) + \operatorname{var}\left(\left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_{t+1}\right) + \operatorname{var}\left(e_{t+1}\right)$$ The first $\boldsymbol{\Phi_e}$ should be $\boldsymbol{\Phi_u}$ instead.

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*p. 313, Equations (6.43), (6.44)	$t \| t - 1$	<u>***t* + 1|*t***</u> (Note both formulations are equivalent, but for consistency, we should use the corrected form.)
*p. 315, Equations (6.48), *p. 316, Equation (6.49)	$t \| t - 1$	<u>***t* + 1|*t***</u> (Note both formulations are equivalent, but for consistency, we should use the corrected form.)
*p. 317, line 1	…or for a symmetric matrix this…	…or, for a symmetric matrix, this…
*p. 319, lines 13, *p. 320, line 2	…last nonzero value…	…last zero value…
*p. 319, line 16/17	…first nonzero value…	…last zero value…

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*p. 324, Equations (6.64), (6.66); p. 325, Equations (6.69), (6.70), (6.71)	$t \mid t-1$	**<u>$t+1 \mid t$</u>** (Note both formulations are equivalent, but for consistency, we should use the corrected form.)
p. 324, Equations (6.64), (6.66); p. 325, Equations (6.69), (6.70), (6.71)	t	**<u>$t+1$</u>** (Where it is not given as $t+1$.)
*p. 325, line 8	…are uncorrelated. Thus, the variance can be written as…	…are **<u>uncorrelated, the</u>** variance can be written as…

Page, line	Current Form	Correction
p. 325, lines 8/9	…r_t and e_t are uncorrelated, and e_t and $\left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_t\cdots$	…r_{t+1} and e_{t+1} are uncorrelated, and e_{t+1} and $\left(\Phi_e\left(z^{-1},\vec{\theta},\hat{\vec{\theta}}\right)-\mathcal{I}\right)e_{t+1}\cdots$
p. 327, line 17	Since this resembles an ARMAX model,…	Since this resembles an **ARX** model,… (*more precise*)
*p. 339, Question 10)	A first-order Box-Jenkins model…	In open-loop system identification, a first-order Box-Jenkins model…
*p. 368, Table 7.10, column 1, row 7	`mNL=nlarx(z,nn,basis);`	`mNL=nlarx(z,nn,basis)`
*p. 381, line 19	…the correspindg measured values	…the corresponding measured values
*p. 374, line 2	`%Custom-built function that creates the corelation plot given`	`%Custom-built function that creates the` **`correlation`** `plot given`
*p. 374, line 9	`axis1: the lable for the axis (can be left blank)`	`axis1: the` **`label`** `for the axis (can be left blank)`
*p. 374, line 30	`%Custom-built function that creates the crosscorelation plot`	`%Custom-built function that creates the` **`cross-correlation`** `plot`

Page, line	Current Form	Correction
*p. 375, line 27; p. 376, line 8	`crosscorrelation`	`cross-correlation`
*	1-sample	one-sample
p. 417, Chapter 1, (21)	MAD = 1.84;…(c) Q1 = 2;…	MAD = 2;… (c) Q1 = 2.25;…
*p. 417, Chapter 2, (1)	(1) T;	(1) F;
p. 418, Chapter 2, 34	c) $4.84 \le \psi \le 6.41$, yes; d) sampled mean is not equal to the true value	c) $0.84 \le \psi \le 2.41$, no; d) sampled mean is equal to the true value
p. 419, Chapter 4, 25	(a brief outline of the solution) A fractional factorial design with centre point replicates. Blockingand randomisation should also be considered.	(a brief outline of the solution) A fractional factorial design with centre point replicates. **Blocking and** randomisation should also be considered.
p. 419, Chapter 5 (1) and (2)	(1) T; (2) F;	(1) F; (2) T;

Page, line	Current Form	Correction
p. 419, Chapter 6 (3), (6), and (13)	(3) T; (6) t; (13) T	(3) **F**; (6) **T**; (13) **F**