This applies to the first edition of the text.

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Time Series Analysis and Its Applications
Errata2

(Second and Third Printings & Some Additional First Printing)

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Chapter 1

- p8: Figure 1.5 caption: ... various location*s* ...
- p17: First equation on the page and first sentence of Example 1.13: Ew_t should be $E(w_t)$ for consistent notation.
- p28: Table 1.2 p. 28: last column should be labeled $n = 100$.
- p62: Eqn (1.115): $o_p(\delta_n)$ should be $O_p(\delta_n)$.
- p65: In statement of Theorem 1.3. Let x_i, for $i = 1, \dots, n$ be ...
- p67: Above the expression for y_{mn}. For $m > 2M$
- p67: Near bottom, replace $m - (m - M - 1) = M + 1$ by $m + 1 - (m - M) = M + 1$
- p68: Under (i). $(n/r)^{(-1/2)} \to m^{1/2}$: $y_{mn} \xrightarrow{d} y_m$.
- p68: Under (ii). $\phi_m(\lambda)$
- p70: Under (i), modify second expression.

$$V_m = \sum_{h=-2m}^{2m} \gamma(h) = \sigma_w^2 \Big(\sum_{j=-m}^{m} \psi_j \Big)^2.$$

- p80: Problem 1.8: Should read: Let w_t, for $t = 1, 2, \dots$.

Chapter 2

- p98: Eqn (2.21) + sign missing, should be $\ldots + \phi_p x_{t-p}$
- p109: In Example 2.11: should read "Because $\gamma(1) = c\phi$, ..., so the *specific* solution ..."
- p110: First paragraph of PACF section: should read "Hence, it is worthwhile . . . that will behave like the ACF for *MA models, but for* AR models, . . . "
- p117: First paragraph: Example 2.17 (*not* 2.16).
- p120: Section on Forecasting ARMA, change the third sentence to read: "Throughout, we assume x_t is a causal and invertible ARMA(p, q) process, $\phi(B)x_t = \theta(B)w_t$, where $w_t \sim \mathrm{N}(0, \sigma_w^2)$."
- p129: Above eqn (2.97): Add a space between the words ***likelihood*** and *becomes*.
- p151: First paragraph: "... to lag 30 ..." (*not 36*).
- p156: Eqn (2.136) should have $\Theta_Q(B^s)$.
- p156: Eqn (2.137): Remove parentheses from $\Phi_P B^{Ps}$.
- p161: Example 2.40: An ARIMA(1,1,0)×(2,1,1)$_{12}$ fits better than the model suggested in the example, namely ARIMA(1,1,0)×(0,1,1)$_{12}$. It has a smaller AICc and the Q-statistic is no longer significant.
- p171: First line: ... per 10,000 (*not* 1,000).
- p175: Top paragraph (occurs twice): " ... threshold of .04..." (not 0.4).
- p177: Line 5 from bottom. (2.158) instead of (2.159).
- p185: Above (2.177). The simplest ARCH model...
- p187: Equation (2.185), delete " $\mathrm{var}(y_t^2) =$ " from the equation.
- p196: Below (2.203). Should read: ... (1.101) *to* (1.105) ... instead of *and*.
- p196: 2nd displayed equation after (2.203): Should read $x_t = \psi(B)w_t = ...$ [not $x_t = \psi(B)z_t = ...$].
- p203: Problem 2.11, first sum: a_i
- p207: Problem 2.26, plus sign missing: $\cdots + \beta_q t^q$....

Chapter 3

- p218: Below eqn(3.5), should read "...will be 72 *months* or ..."
- p272: In first line of first equation, write $e^{2\pi i\nu u}$ instead of $e^{2\pi i\nu h}$
- p272: Top equation, second integral: $e^{2\pi i\nu u}$
- p272: Second line of equation: $\gamma(u)$
- p273: In definition of I_n, $\exp(2\pi it\nu_j)$ should be $\exp(-2\pi it\nu_j)$.
- p287: Paragraph beginning Example 3.22. sine, not since; of the input; normal distribution.
- p289: Problem 3.1 (a): Remove extra 'is': "... and ϕ *is is* uniformly ..."
- p299: Problem 3.25. Add that v_t and w_t are normally distributed. Replace var w_t and var v_t by $\text{var}(w_t)$ and $\text{var}(v_t)$ for consistent notation.

Chapter 4

- p301: Eqn (4.1): plus sign missing: $\cdots + \beta_{tq} z_{tq} + \ldots$.
- p302: Eqn (4.1) and below: Write w_{ti} instead of w_{it}, and write $\text{cov}(w_{ti}, w_{tj})$ instead of $\text{cov}(w_{it}, w_{jt})$ for consistency.
- p313: Last sentence: ... of Section T2.15 ... (not T2.16).
- p314: Line above eqn (4.43) should read: Thus, using the results of Theorems 2.2 (d) and 2.3 of Section T2.15, we can write ...
- p317: First and second equations on the page, the tranposes are transposed. They should be:

$$-2\ln f(\boldsymbol{x}_{t-1}, \boldsymbol{x}_t | Y_n) \propto \left(\boldsymbol{x}_{t-1} - \boldsymbol{x}_{t-1}^{t-1}\right)' \left[P_{t-1}^{t-1}\right]^{-1} \left(\boldsymbol{x}_{t-1} - \boldsymbol{x}_{t-1}^{t-1}\right) + \left(\boldsymbol{x}_t - \Phi \boldsymbol{x}_{t-1}\right)' Q^{-1} \left(\boldsymbol{x}_t - \Phi \boldsymbol{x}_{t-1}\right) + d(\boldsymbol{x}_t),$$

$$l(\boldsymbol{x}_{t-1}) = \left(\boldsymbol{x}_{t-1} - \boldsymbol{x}_{t-1}^{t-1}\right)' \left[P_{t-1}^{t-1}\right]^{-1} \left(\boldsymbol{x}_{t-1} - \boldsymbol{x}_{t-1}^{t-1}\right) + \left(\boldsymbol{x}_t^n - \Phi \boldsymbol{x}_{t-1}\right)' Q^{-1} \left(\boldsymbol{x}_t^n - \Phi \boldsymbol{x}_{t-1}\right),$$

- p324: In (4.69), $n \ln|Q|$ and $n \ln|R|$.
- p327: In (4.79). $\Phi K \boldsymbol{y}_t$ instead of $K\boldsymbol{y}_t$, $\Phi K \boldsymbol{\epsilon}_t$ instead of $K\boldsymbol{\epsilon}_t$.
- p328: The second paragraph on controllability should be corrected as follows:

  In a similar manner, to define ***controllability***, write the state noise as $\boldsymbol{w}_t = B\boldsymbol{u}_t$, where B is $p \times r$ and $\boldsymbol{u}_t$ is an r-dimensional, nonsingular, white noise process. Thus, the state equation is $\boldsymbol{x}_t = \Phi \boldsymbol{x}_{t-1} + B\boldsymbol{u}_t$. If the matrix $\mathcal{C} = [B, \Phi B, \Phi^2 B, ..., \Phi^{p-1} B]$ has full rank p, the process is said to be controllable (or ***reachable***). Controllability has to do with the fact that the state equation, satisfies

  $$\boldsymbol{x}_{t+p} = \sum_{j=0}^{p-1} \Phi^j B \boldsymbol{u}_{t+p-j} + \Phi^p \boldsymbol{x}_t = \mathcal{C}\boldsymbol{U}_t + \Phi^p \boldsymbol{x}_t,$$

  where $\boldsymbol{U}_t = (\boldsymbol{u}_{t+p}', ..., \boldsymbol{u}_{t+1}')'$. If we think of the variables $\{\boldsymbol{u}_{t+p}, ..., \boldsymbol{u}_{t+1}\}$ as "controlling" the state output $\boldsymbol{x}_t$, and we act as if we are free to choose the $\boldsymbol{u}_t$ at will, the fact that $\mathcal{C}$ is full rank means any desired value of $\boldsymbol{x}_{t+p}$ can be obtained from any initial state $\boldsymbol{x}_t$ by control of $\boldsymbol{U}_t$. In particular, we can put $\boldsymbol{U}_t = \mathcal{C}'(\mathcal{C}\mathcal{C}')^{-1}\boldsymbol{x}_{t+p} - \Phi^p \boldsymbol{x}_t$.

- pp313-314: References to Section T2.16 should be to T2.15.
- p314: Below (4.43). The evaluation of P_t^t is easily computed as the conditional covariance corresponding to (4.43), namely

  $$P_t^t = \text{cov}\left(\boldsymbol{x}_t \;\middle|\; Y_{t-1}, \boldsymbol{\epsilon}_t\right) = P_t^{t-1} - P_t^{t-1} A_t' \Sigma_t^{-1} A_t P_t^{t-1},$$

  which simplifies to (4.38).
- p338: Paragraph after P4.6: change *nonsingularity* to *singularity*.
- p338: After eqn (4.112): ... $\text{cov}(w_t, v_t) = (\theta + \phi)\text{var}(v_t) = (\theta + \phi)R$, ... [no square on the $(\theta + \phi)$ term].
- p390: 8th line from top: "evidence of of some ..." remove extra of.
- p404: Problem 4.1 (c): σ_0^2 instead of σ_0 for consistency.
- p406: Problem 4.8 should begin: Let y_t represent the land-based global temperature series shown in Figure 4.2. The data file for this problem is `HL.dat` on the web site.

- p406: Problem 4.8(b): Change $\nabla^3 x_t = w_t$ to $\nabla^2 x_t = w_t$, and change the hint to read: The state will be a 2×1 vector, say $\boldsymbol{x}_t = (x_t, x_{t-1})'$.
- p407: Problem 4.10(b): $P^2 - \phi^2 P - 1 = 0$
- p410: Problem 4.24 should have two parts. Fit ... to: (a) the GNP residuals anlayzed in Example 2.46 and compare the results to those obtained in that example; (b) the stock dividend yield series and compare the results to those obtained in Problem 2.43.

Chapter 5

- p422: In (5.26). $\boldsymbol{\beta}_t^{M'}$
- p428: 3rd line below (5.40). $\delta_t = 1$.
- p436: In (5.68). h_r instead of h_t.
- p443: Near bottom: $(\mu_t, \alpha_{1t}, \alpha_{2t}, \beta_{1t}, \gamma_{11t}, \gamma_{21t})'$
- p453: In (5.108). Π_j instead of $\Pi_j(\boldsymbol{x})$.
- p457: In $g_2(\boldsymbol{x})$ near bottom. $42.61 x_1$.
- p488: Above eqn (5.187):

$$f_x(\nu; \boldsymbol{\beta}) = \boldsymbol{\beta}' f_y(\nu) \boldsymbol{\beta} = \boldsymbol{\beta}' f_y^{\text{re}}(\nu) \boldsymbol{\beta}.$$

- p523: Problem 5.7:

$$\widehat{A}(\nu) = \frac{B_w(\nu) - \phi(\nu) Y.(\nu)}{1 - |\phi(\nu)|^2}$$