Errata for "Methods of Applied Mathematics"

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- **p. 14**. The equation in Example 1.1 (above the footnotes) is missing an equal sign. It should be

$$\ldots \rightarrow \mathbf{adj}(A)\ A = A\ \mathbf{adj}(A) = \begin{pmatrix} 27 & 0 & 0 \\ 0 & 27 & 0 \\ 0 & 0 & 27 \end{pmatrix}$$

- **p. 15**. In Example 1.2, there are wrong signs for the off-diagonal terms for $\mathbf{adj}(\lambda I - A)$ and $(\lambda I - A)^{-1}$. They should be

$$\begin{aligned} \mathbf{adj}\,(\lambda I - A) &= \begin{pmatrix} \lambda - a_{22} & a_{12} \\ a_{21} & \lambda - a_{11} \end{pmatrix} \\ (\lambda I - A)^{-1} &= \frac{1}{\lambda^2 - (\mathbf{tr}(A))\,\lambda + \mathbf{det}\,(A)} \begin{pmatrix} \lambda - a_{22} & a_{12} \\ a_{21} & \lambda - a_{11} \end{pmatrix} \end{aligned}$$

- **p. 29**. Line below equation (1.29), missing word "from". It should be

  "... is obtained from A by replacing ..."

- **p. 29**. In example 1.10, missing **det** operations in last equation on page. It should be

$$x_2 = \quad \ldots \quad = \frac{\mathbf{det} \begin{pmatrix} 1 & 2 & 2 \\ 2 & 3 & 0 \\ -1 & 2 & 3 \end{pmatrix}}{\mathbf{det} \begin{pmatrix} 1 & 0 & 2 \\ 2 & 2 & 0 \\ -1 & -1 & 3 \end{pmatrix}} = \frac{11}{6}$$

- **p. 30**. Error in vector p and matrix X for the numerical illustration of example 1.11 (middle portion of the page). It should be

  ...
  As a numerical illustration, let $N = 2$ and $R = 2$ and

$$\mathbf{F} = \ldots \qquad \text{and} \qquad \mathbf{p} = \begin{pmatrix} 0.4 \\ 0.5 \\ \hline 0.4 \\ 0.6 \end{pmatrix}$$

$$\vdots$$

$$W = \ldots \qquad\qquad X = \begin{pmatrix} 0.1429 & 0.6190 \\ 0 & 0.3333 \end{pmatrix}$$

- **p. 34**. Wrong signs in matrix result (last equation) of example 1.14. It should be

$$\int_0^\pi \ldots d\theta = \begin{pmatrix} p_1 & p_2 \end{pmatrix} \begin{pmatrix} 0 & 2 \\ -2 & 0 \end{pmatrix} \begin{pmatrix} p_1 \\ p_2 \end{pmatrix} = 0$$

- **p. 53**. In last line on the page, replace R by U. It should be

  $\ldots \mathbf{x}^T Q\mathbf{x} = \mathbf{x}^T L\mathbf{x} = \mathbf{x}^T U\mathbf{x}$.

- **p. 163**. In Table 4.4, wrong sign for the matrix representation of $\mathbf{a} \times \mathbf{b}$. It should be

$\mathbf{a} \times \mathbf{b}$	$-H^{[a]}\mathbf{b}$

- **p. 199**. Last line of **E4.11** (line above **E4.12**), replace **w** by **u**. It should be

  ... takes vector **y** and yields vector **u**.

- **p. 238**. Error in right portion of equation above **Remarks**. It should be

$$\widehat{y} = \frac{1}{2}\left(\frac{\widehat{C}}{\widehat{x}^2} - 1\right) \qquad \rightarrow \qquad \ldots$$

- **p. 240**. In theorem 6.1, definitions of $\tilde{x}$ and $\tilde{y}$ are missing x and y, respectively. It should be

  > ... *transformations given by* $\tilde{x} = \lambda^{\alpha} x$ *and* $\tilde{y} = \lambda^{\beta} y$*, where* ...

- **p. 253**. Missing parenthesis in equation (2 equations above equation (6.55)). It should be

$$\frac{d}{dt}\left(e^{-At}\mathbf{x}\right) = e^{-At}\mathbf{b}(t)$$

- **p. 255**. (In middle portion of page) The reference to equation (6.14) should instead be to "last equation" It should be

  > ... with respect to λ, of both sides of the last equation and then setting ...

- **p. 263**. For last equation before the exercises, the upper limit in integral should be t instead of ∞. It should be

$$\begin{aligned} \mathbf{x} &= \ldots \\ &= \ldots \\ &= e^{At}\mathbf{x}(0) + \int_0^t e^{A(t-\tau)}\mathbf{b}(t)\, dt \end{aligned}$$

- **p. 269**. Wrong headings in Table 6.1. It should be

Data set 1			Data set 2			Data set 3		
Time	x_A	x_B	Time	x_A	x_B	Time	x_A	x_B
$\vdots$			$\vdots$			$\vdots$		

- **p. 287**. In equation (7.38) and the previous equation, replace a_i by α_i. It should be

$$y_{k+1} = \sum_{i=0}^{m} \alpha_i y_{k-i} + h \sum_{j=-1}^{m} b_j f\left(y_{k-j}\right)$$

  the BDF methods ... formula to be

$$y_{k+1} = \sum_{i=0}^{m} \alpha_i y_{k-i} + h b_{-1} f\left(y_{k+1}\right) \qquad (7.38)$$

- **p. 302**. In the equation before example 7.8, replace $\mathbf{x}_0$ by $\mathbf{z}_0$. It should be

$$\textbf{IVS}\left[\left(\frac{d}{dt}\mathbf{z}=\mathbf{A}(t)\mathbf{z}+\mathbf{b}(t),\ \mathbf{z}_0=\begin{pmatrix}0\\ \vdots\\ 0\end{pmatrix}\right)\right]\qquad\longrightarrow\qquad\mathbf{z}(t=T)$$

- **p. 303**. Wrong sign in last equation result of example 7.8. It should be

$$\mathbf{x}(0)=\ldots=\begin{pmatrix}0\\ -20.182\end{pmatrix}$$

- **p. 307**. Last line of **E7.5**, change "attached CDROM" to "book's webpage".

- **p. 465**. In line above equation (12.42), insert word "of" between "root" and "$den(z)$".

- **p. 474**. Wrong derivative in left side of equation (12.78). It should be

$$\mathcal{L}\left[\frac{\partial^k}{\partial x^k}u(x,t)\right]=\frac{d^k}{dx^k}\mathcal{L}\left[u(x,t)\right]=\frac{d^k}{dx^k}\widehat{U}(x,s)\qquad(12.78)$$

- **p. 475**. Wrong partial derivative in right side of equation (12.79). It should be

$$\mathcal{L}\left[\frac{\partial^k}{\partial t^k}u(x,t)\right]=s^k\widehat{U}(x,s)-\ldots\qquad(12.78)$$

- **p. 557**. Error in partial differential equation in exercise **E14.11**. It should be

$$\left(\frac{\partial^2 v_z}{\partial x^2}+\frac{\partial^2 v_z}{\partial y^2}\right)=-\beta$$