A First Course in Differential Equations, 3rd ed.

Springer-Verlag, NY (2015)

J. David Logan, University of Nebraska

ERRATA

This supplement contains corrections in the text. It is an on-going collection, and the author would be grateful if readers could forward to me any new ones that they find. Mail them to `jdavidlogan@gmail.com`.

Chapter 1 Corrections

page 4, The pendulum equation is $\theta'' + \frac{g}{L}\sin\theta$.

page 22, replace $x(1) = 0$ by $x(0) = 1$.

page 26, Exercise 1(e). The differential equation should be $x' = ax + b$.

page 27, Exercise 1(c). Change the initial condition to $y(1) = \pi/2$.

page 33. The more general linear equation resulting from unequal volumetric flow rates may be solved by methods from Section 1.4.

page 42, Exercise 3(b). Change the initial condition to $v(0) = 1$.

page 45. The differential equation modeling the chemical reactor is

$$C' + \frac{q_{\text{in}}}{V(t)}C = \frac{q_{\text{out}}}{V(t)}C_{in}$$

page 48. Exercise 10 should refer to Section 1.3.

page 70. The differential equation in Exercise 1(a) is intended to be $x' = h - x^2$.

Chapter 2 Corrections

page 83. The reference to the RCL circuit should cite Section 1.4 (or Section 1.4.3).

page 85. In 3(c) the governing equation is $mx'' = -kx - \gamma x'$.

page 94. In Table 2.1, the case of real unequal roots should read $x(t) = c_1 e^{\lambda_1 t} + c_2 e^{\lambda_2 t}$.

page 108. The method of undetermined coefficients gives $-4A - 3B = 1$, $3A - 4B = 0$. So that $A = -0.16$ and $B = -0.12$. The initial conditions imply that $c_1 = 4.16$ and $c_2 = 4.6$.

page 112. It is also thought that so-called "negative damping" rather than classical resonance was responsible for the Tacoma Narrows Bridge collapse.

page 120, Exercise 1(e). $t^2 x'' + 3tx' + x = 0$.

page 122. The particular solution in Example 2.33 should be

$$x_p = \frac{1}{3} \cos \ln(\cos 3t) + t \sin 3t.$$

page 123. The differential on the integral describing the rest solution should be ds rather than dx.

page 124, Exercise 5. $Lx \equiv x'' + px' + qx$.

page 126, Exercise 7. "$x(t) = z(t)y(t)$" should read "$x(t) = v(t)y(t)$"

page 130, Exercise 3. In the equation, $\sin 5t$ should read $\sin 2t$.

page 136, Exercise 9. The Dupuit–Forchheimer equation should read

$$\frac{K}{2}(h^2)'' = -q.$$

Chapter 3 Corrections

page 154. The equation should read $x(t) = \int (t-3)H(t-3)dt = \frac{1}{2}(x-3)^3 H(t-3)$.

page 157, Exercise 5. replace "tranform" with "transform".

page 168. The second equation should read

$$\int_0^t \delta_a(\tau)\phi(t-\tau)d\tau = H(t-a)\phi(t-a).$$

page 175. The Table should be corrected:

- Replace $H(t-a)(t)f(t-a)$ with $H(t-a)f(t-a)$.
- Replace $\frac{2bs}{(s^2+k^2)^2}$ with $\frac{2ks}{(s^2+k^2)^2}$

- Replace $\frac{s^2-b^2}{(s^2+k^2)^2}$ with $\frac{s^2-k^2}{(s^2+k^2)^2}$

page 164, Exercise 15(d). As the problem stands, the solution is $x(t) = 0$. A better problem is

$$x(t) = -2 + \int_0^t \cos(t-r)x(r)dr.$$

page 164, Exercise 17. The integral equation should read

$$f(t) = \frac{1}{\sqrt{\pi}} \int_0^t \frac{x(\tau)}{\sqrt{t-\tau}} d\tau.$$

Chapter 5 Corrections

page 284, Exercise 11. The second equation should read

$$\frac{dG}{dt} = c_2 G(1-G) - c_1 TG - d_2 G.$$