Errata for
Introduction to Dynamical Systems: Discrete and Continuous, 2nd edition

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p. 58 L. 13: (Problem 4) More complete statement of the problem is as follows:

Consider an LRC electric circuit with linear inductor, resistor, and capacitor: $L\,\frac{di_L}{dt} = v_L$, $v_R = R\,i_R$, and $C\,\frac{dv_C}{dt} = i_C$ with $R > 0$, $L > 0$, and $C > 0$. Setting the two variables $x = i_R = i_L = i_C$ and $y = v_C$, we get the system of linear differential equations

$$\begin{aligned} L\,\frac{dx}{dt} &= -R\,x - y \\ C\,\frac{dy}{dt} &= x. \end{aligned}$$

(Compare with Section 6.8.2 for a nonlinear resistor.) Sketch the phase portrait for the three cases (a) $R^2 > 4L/C$, (b) $R^2 = {}^{4L}/_{C}$, and (c) $R^2 < {}^{4L}/_{C}$. What happens when $R = 0$ but $L > 0$ and $C > 0$.

p. 99 L. 18: $\tau < \min\left\{\frac{r}{K}, \frac{1}{L}\right\}$

p. 101 L. 6: Insert the following sentence: "For a small time interval, both solutions are in some closed ball $\bar{\mathbf{B}}(\mathbf{x}_0, r)$ and there is some constant L as in Theorem 3.3.1." Then,

p. 113 L 10: Insert the following: "Also assume that the differential equation is defined in all of $\bar{\mathbf{B}}(\mathbf{0}, C)$."

p. 148 L -4:

$$D\mathbf{F}_{(\mathbf{x}^*)} == \begin{pmatrix} -x_1^* & -\alpha\,x_1^* & -\beta\,x_1^* \\ -\beta\,x_2^* & -x_2^* & -\alpha\,x_2^* \\ -\alpha\,x_3^* & -\beta\,x_3^* & -x_3^* \end{pmatrix}.$$

p.149 L 2:

$$\frac{1}{1+\alpha+\beta}\left(-1 + \frac{\alpha+\beta}{2}\right) = \frac{\alpha+\beta-2}{2(1+\alpha+\beta)} > 0.$$

p. 149 L 1-2: (An alternative argument is as follows:) Once we know that two eigenvalues are complex pairs, then we can find their real parts as follows.

$$\begin{aligned} 2\,\mathrm{Re}(\lambda_2) &= \lambda_2 + \lambda_3 \\ \lambda_1 + \lambda_2 + \lambda_3 &= \mathrm{tr}(D\mathbf{F}_{(\mathbf{x}^*)}) = \frac{-3}{1+\alpha+\beta} \\ 2\,\mathrm{Re}(\lambda_2) &= \frac{-3}{1+\alpha+\beta} - (-1) \\ &= \frac{\alpha+\beta-2}{1+\alpha+\beta} \\ \mathrm{Re}(\lambda_2) = \mathrm{Re}(\lambda_3) &= \frac{\alpha+\beta-2}{2(1+\alpha+\beta)} > 0. \end{aligned}$$

p. 149 L -12: Therefore, any orbit with $S(0) > 0$ must enter and remain in the set where $S \leq 2$.

p. 149 L -3: strict Lyapunov function and any trajectory off the diagonal must go to the minimum

p. 204 L 10: Since $\hat{\mathbf{S}}_I = \bigcup_{J \supset I} \mathbf{S}_J$,

p. 204 L -8,-7: Better, "For all $\mathbf{x} \in \mathrm{int}(S)$, $\mathbf{z} = \mathbf{A}\mathbf{x} \in \mathbf{W}$, so $\mathbf{c} \cdot \mathbf{A}\mathbf{x} < 0$."

p. 209 L 1: $f_j'(x_j) > 0$

p. 348 L -4: delete “most initial conditions do converge to a root of the polynomial, and certainly,”, so it reads “Still, if we start near a root ...”

p. 376 L -13: delete “most initial conditions do converge to a root of the polynomial, and certainly,”, so it reads “Still, if we start near a root ...”