Errata

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Ordinary Differential Equations and Dynamical Systems

Graduate Studies in Mathematics, Vol. 140
American Mathematical Society, Providence, Rhode Island, 2012

The official web page of the book:
`http://www.mat.univie.ac.at/~gerald/ftp/book-ode/`

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Updated as of April 18, 2014

Errata

Changes appear in yellow. Line $k+$ (resp., line $k-$) denotes the kth line from the top (resp., the bottom) of a page. My thanks go to the following individuals who have contributed to this list: Theresa Dvorak, Gudrun Szewieczek, William Jagy, Jonathan Eckhardt, Sebastian Woblistin, Yu Jiang, Annemarie Luger, Johannes Wächtler, Daniel Scherl, Kristoffer Varholm, Constantino Santos, Minjae Park.

Page 6. 7+: Furthermore, $K^{j+1} \in C^k(U_j, M)$ for any

Page 19. Problem 1.26, second item: $y(x_0+x) = y(x_0 - x)$

Page 45. 10+: $\Delta(t) = |\phi(t, t_0, y_0) - \phi(t, s_0, y_0)|$ and use ...

Page 57. 4+: Taking $m \to \infty$ we finally obtain

Page 73. Problem 3.13: It should read $\deg(q(t)) \le \deg(p(t)) + s$ where s is the size of the largest Jordan block corresponding to the eigenvalue β. Moreover, here is an extended hint:

(Hint: Investigate (3.48) using the following fact: $\int^t (t-s)^m p(s) \mathrm{e}^{\beta s} ds = q(t)\mathrm{e}^{\beta t}$, where $q(t)$ is a polynomial of degree $\deg(q) = \deg(p)$ if $\beta \neq 0$ and $\deg(q) = \deg(p) + m + 1$ if $\beta = 0$. First show $m = 0$ using integration by parts and then use induction and again integration by parts.)

Page 90. Problem 3.34: Consider the equation $\ddot{x} + q_0(t)x = 0$.

Page 90. Problem 3.37:

$$y^{(n)} + \sum_{k=0}^{n-2} \sum_{j=k}^{n} \binom{j}{k} q_j(t) Q^{(j-k)}(t) y^{(k)} = 0,$$

Page 90. Problem 3.38:

$$\dot{y} + \mathrm{e}^{-Q(t)} y^2 + \mathrm{e}^{Q(t)} q_0(t) = 0.$$

Page 126. Problem 4.5: $\Gamma(z) = \frac{(-1)^n}{n!(z+n)} + O(1)$.

Page 126. Problem 4.11 (iii): $J_{\nu+1}(z) - J_{\nu-1}(z) = -2J'_\nu(z)$

Page 154.

$$y(x) = y(x_0)c(z,x,x_0) + p(x_0)y'(x_0)s(z,x,x_0) + \int_{x_0}^{x} s(z,x,t)g(t)r(t)dt. \quad (5.50)$$

Page 155. Problem 5.13:

$$Q(y) = \frac{q(x(y))}{r(x(y))} - \frac{(p(x(y))r(x(y)))^{1/4}}{r(x(y))} \big(p(x(y))((p(x((y))r(x(y)))^{-1/4})'\big)'.$$

Page 162.

$$\min_{x\in[a,b]} \frac{q(x)}{r(x)} \le E_0. \quad (5.77)$$

Page 168. In fact, $\theta_b(\lambda, x)$ as defined in (5.89) is the Prüfer angle for $-u_b(\lambda, x)$, but this will be of no importance for our purpose.

Page 169.

$$\#_{(-\infty,\lambda)}(L) = \left\lceil \frac{\theta_a(\lambda,b)-\beta}{\pi} \right\rceil = \left\lceil \frac{\alpha-\theta_b(\lambda,a)}{\pi} \right\rceil - 1, \quad (5.91)$$

Moreover, note that we also have:

$$\#_{(-\infty,\lambda]}(L) = \left\lfloor \frac{\theta_a(\lambda,b)-\beta}{\pi} \right\rfloor + 1 = \left\lfloor \frac{\alpha-\theta_b(\lambda,a)}{\pi} \right\rfloor,$$

Page 172. Replace “As in the case of Theorem 5.18 one proves” by ”As an immediate consequence of Lemma 5.16 we obtain”

Page 213. Proof of Theorem 7.4: Exchange the definitions of Q_3 and Q_4.

Page 222. The proof of Lemma 7.13 only shows that $\omega_\sigma(x)$ contains a regular periodic orbit. However, the claim follows from Lemma 7.13 if $\omega_\sigma(x)$ is connected. Moreover, connectedness follows from compactness as in the proof of

Lemma 6.6. In particular, the connectedness assumption in Theorem 7.16 is superfluous.

Page 225. First equation in the example:

$$f(x,y) = \begin{pmatrix} y \\ -\eta E(x,y)^2 y - U'(x) \end{pmatrix},$$

Page 259. Theorem 9.3: there are neighborhoods $U(x_0)$ of x_0 and U of 0 and a function $h^{+,\alpha} \in C^k(E^{+,\alpha} \cap U, E^{-,-\alpha})$ such that

Page 261. Theorem 9.4: there are neighborhoods $U(x_0)$ of x_0 and U of 0 and functions $h^{\pm} \in C^k(E^{\pm} \cap U, E^0 \oplus E^{\mp})$ such that

Page 266. Proof of Lemma 9.7: The equation $A^{-1} \circ \varphi \circ \vartheta = \varphi \circ \vartheta \circ A^{-1}$ should read $f \circ \varphi \circ \vartheta = \varphi \circ \vartheta \circ f$. This last equation implies $\varphi \circ \vartheta = \mathbb{I} + l$, where l is a solution of $Ll(x) = g(x) - g(x + l(x))$. Using the estimates for the inverse of L and for g one obtains $l \equiv 0$ and thus φ is a homeomorphism.

Page 268. The very last equation on the bottom of the page is only try if Φ_t is linear. Set $\Phi_t = \mathrm{e}^{tA} + G_t$, where G_t is bounded, and replace this equation by

$$h_t = \Phi_t \circ \varphi \circ \mathrm{e}^{-tA} - \mathbb{I} = \mathrm{e}^{tA} \circ h \circ \mathrm{e}^{-tA} + G_t \circ \varphi \circ \mathrm{e}^{-tA},$$

where both terms are bounded.

Page 268.

$$\varphi(x) = (x_1 + x_2^2, x_2). \tag{9.38}$$

Page 296. Second sentence after (11.10): Change W^s to W^+.

Page 333. Change W^s to W^+ and W^u to W^- in the picture and the text before the picture.