Differential Dynamical Systems — Errata (2nd & 3rd Printings)

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Errors are listed by page and line number. The symbol $\Longrightarrow$ means "replace with". A negative line number means count from the bottom of the page. Each equation line is counted as one line.

Note that the first printing has 10 9 8 7 6 5 4 3 2 1 on the copyright page. The second printing was out in March 2009, and has 10 9 8 7 6 5 4 3 2 on the copyright page. The third printing was out in 2011, and did not have any changes from the 2nd.

Ch.	Page	Line	Change	Thanks
1	8	2	as $t \to \infty \Longrightarrow$ as t increases	
	16	3	in the interior of $E \Longrightarrow$ in the interior of M	II
	16	3	in the interior of $E \Longrightarrow$ in the interior of M	II
	16	14	$M \setminus R \Longrightarrow \text{int}(M) \setminus R$	JGR
	21	10(1.32)	$\frac{4\pi^2}{LH}AC \Longrightarrow \frac{\pi^2}{LH}AC$, $\frac{\pi^2}{LH}AB \Longrightarrow \frac{\pi^2}{2LH}AB$, $\frac{4\pi^3}{H^2}C \Longrightarrow \frac{4\pi^2}{H^2}C$	TB
	24	1,12	Menton $\Longrightarrow$ Menten	JGR
2	41	3	any operator $\Longrightarrow$ any linear operator	JGR
	50	7	λ_k is an eigenvector $\Longrightarrow$ λ_k is an eigenvalue	PM
	58	-1	Consequently, $\Longrightarrow$ for any $x_0 \in E^s$, the stable subspace of A. Consequently,	HLS
	63	-12	solutions (2.48) $\Longrightarrow$ solutions (2.49)	AR
	66	-6	$M^2 = e^{TR} \Longrightarrow M^2 = e^{2TR}$	MS
	67	16	a vector subspace $\Longrightarrow$ a complete vector subspace	JGR
	67	-5	$t \in R \Longrightarrow t \in \mathbb{R}$	
	68	8	Replace (d) with: Finally argue that if $e^{tA}e^{tB} = e^{t(A+B)}$ then differentiation with respect to time implies that $F(t) = G(t)$. By differentiating again, finally show that $[A, B] = 0$.	
3	76	-4	For a function $\Longrightarrow$ If a function	TB
	76	-3	the derivative at $\Longrightarrow$ is differentiable then the derivative at	TB
	78	-2	normed space $\Longrightarrow$ metric space	TB
	80	4	$f_j \in Y \in X \Longrightarrow f_j \in Y \subset X$	
	83	-14	to arbitrary compact sets. $\Longrightarrow$ to arbitrary compact sets using the following lemma.	
	83	-13	Corollary 3.8 $\Longrightarrow$ Lemma 3.8	
	92	16	on $J = [t_o - a, t_o + a] \Longrightarrow$ on $J = [t_o - c, t_o + c]$	
	92	-14	for $t \in J$ and $a = b/M \Longrightarrow$ for $t \in [t_o - a, t_o + a]$ and $a = \min(c, b/M)$	TB
	92	-6	before "This result" add the sentence: "Using Picard iteration or Theorem 3.18, the interval of existence can be extended to the entire interval J."	TB
	94	-3	$b \Longrightarrow g$	TB
	96	-5	Before "Consequently" add the sentence: "However since $u \in B_b(x_o)$ then, by the argument sketched in Exercise 2, f is uniformly C^1 on this compact set and we can assume that $\delta(\varepsilon)$ only."	TB
	97	4	$= \delta(\varepsilon, b) \Longrightarrow = \delta(\varepsilon)$	
	99	7	$B_b(x_o) \Longrightarrow B_{b_o}(x_o)$ (Two places!)	AGH
	99	7	$\lim_{t \to a_o} \Longrightarrow \lim_{t \to t_o + a_o}$	MS
	102	-4	$[t_o - a, t_o + a] \Longrightarrow [t_o - c, t_o + c]$	
	102	-1	for $t \in J \Longrightarrow$ for $t \in [t_o - a, t_o + a]$	

Ch.	Page	Line	Change	Thanks
	103	12	In the exponent, $2K$ should be K.	RC
	103	-10	$\|A\| < M \implies \|A\| \leq M$.	
	103	-6	on $[0, b) \implies$ on $[0, b]$.	
	103	-5	use Theorem 3.18 to $\implies$ extend Theorem 3.18 to the nonautonomous case to	HLS
4	107	-10	the orbit (4.2). $\implies$ the orbit Γ_x.	MS
	110	4	defines a complete flow $\implies$ exists for all $t \in \mathbb{R}$	MS
	110	10	Theorem 3.17 $\implies$ Theorem 3.18	JA
	110	13	Delete the sentence "The solution defines a flow by Lemma 4.2"	SR
	110	-10	The vector field F defines a flow on $\mathbb{R}^n \implies$ The solutions exist for all $t \in \mathbb{R}$	MS
	111	10	Delete ", and therefore define a flow"	MS
	111	-11	Theorem 3.17 $\implies$ Theorem 3.18	JA
	113	-1	when E^c is empty $\implies$ when E^c is trivial	RC2
	121	6	$f_i(x^* + \delta x_j) \implies f_i(x^* + \delta x_j \hat{e}_j)$ AND $g_i(\delta x_j) \implies g_i(\delta x_j \hat{e}_j)$	
	122	11	$\|y_o \leq \delta\| \implies \|y_o\| \leq \delta$	
	130	-10	$\|a\| < 1 \implies \|a\| \leq 1$	
	130	Ftnt 24	"continuous, bijective map that" $\implies$ "continuous, bijective map between compact sets that"	SS
	131	4	"itself, and thus" $\implies$ "itself with a C^1 inverse, and thus"	SS
	132	-10	"map τ" $\implies$ "surjective map τ"	HLS
	132	-5	$t \in (y^{-1}, \infty) \implies t \in (-y^{-1}, \infty)$	
	136	-6	$= (h_2(x_1, x_2) + tx_2) \implies = (h_1(x_1, x_2) + tx_2)$	SS2
	139	-6	$e^{-tA} \cdot H_1 \cdot \varphi_t(x) \implies e^{-tA} \circ H_1 \circ \varphi_t(x)$	
	145	12-14	Replace with "$z \in \bar{\Gamma}^+_{\varphi_T(x)}$. There are now two possibilities: z may be a point in $\Gamma^+_{\varphi_T(x)}$ for each $T \geq 0$ or not. In the first case there must be infinitely many times $t_n \to \infty$ such that $z = \varphi_{t_n}(x)$ implying that z is a limit point and thus in $\omega(x)$. In the latter case there is some time $T \geq 0$ for which $z \notin \Gamma^+_{\varphi_T(x)}$. Since by assumption z is in the closure of $\Gamma^+_{\varphi_T(x)}$, then by"	RM
	145	-16	$\in \omega(s) \implies \in \omega(x)$	MS
	148	18	$\omega(x) \in B \implies \omega(x) \subset B$	MS
	148	-16	Lemma 4.14 $\implies$ Lemma 4.15	MS
	148	-6	"is a subset M of N" $\implies$ is a neighborhood $M \subset N$	MS
	150	8	an attractor $\implies$ an attracting set	JGR

Chap.	Page	Line	Change	Thanks to
	158	15-22	Replace these lines with $\Longrightarrow$ basis vectors perpendicular to $f(x_o)$, then WW^T is the projection onto S where $W = (w_1, w_2, \dots, w_{n-1})$. The matrix DP in the w_i basis has the representation $W^T DQ(x_o)W$. Since $W^T f(x_o) = 0$, we obtain $$DP(x_o) = W^T MW \ .$$ Now add the unit vector $\hat{f} = f(x_o)/\lvert f(x_o)\rvert$ to W to form the orthogonal matrix $U = (W, \hat{f})$. The spectrum of M is identical to that of the similar matrix $$\tilde{M} = U^T MU = \begin{pmatrix} DP(x_o) & 0 \\ \hat{f}^T MW & 1 \end{pmatrix} \ .$$ Because the last column has only one nonzero element, $\det(\lambda I - \tilde{M}) = (\lambda - 1)\det(\lambda I - DP(x_o))$. $\square$	HPR
	163	10	$\mathbb{R}^+ \times \mathbb{S} \Longrightarrow [0, \infty) \times \mathbb{S}$	
5	173	-11	$Df(x_o) = A \Longrightarrow Df(x^*) = A$	TB
	177	-5	Replace this line with $\Longrightarrow$ any t and any $\varepsilon > 0$ there is a $T \geq t$ such that $v(t) \leq u(T) + \varepsilon$. Thus, using (5.22), gives	SS & MS
	177	-4,-2,-1	for each equation $\Longrightarrow$ add an ε to the right hand side of each of the three inequalities.	
	178	1	$u(T + s) \leq v(T) = v(t) \Longrightarrow u(T + s) \leq v(t)$	
	178	5	$z(t) \leq M + \frac{L}{\beta} \int_0^t z(s)ds \Longrightarrow z(t) \leq M + \varepsilon e^{\alpha t} + \frac{L}{\beta} \int_0^t z(s)ds$	
	178	6	replace this line with $\Longrightarrow$ This is of the form of the Grönwall's lemma in Ex. 3.9, so that $z(t) \leq (M + \varepsilon e^{\alpha t})e^{tL/\beta}$. Since this is true for *any* $\varepsilon > 0$, rewriting it in	
	186	3	where E^c is empty. $\Longrightarrow$ where E^c is trivial.	MS
	186	5	where E^c is not empty. $\Longrightarrow$ where $E^c \neq \{0\}$.	MS
	186	14	C^k invariant manifolds $\Longrightarrow$ C^k locally invariant manifolds	TB
	190	-7	$\dot{z} = z \Longrightarrow \dot{z} = \lambda z$	MS
6	222	9	$\Sigma \in \varphi_{t_n} \Longrightarrow \Sigma \ni \varphi_{t_n}$	JGR
	220	13-14	such that $f(x) \neq 0$ for all $x \in \Sigma \Longrightarrow$ such that whenever $x \in \Sigma$, $f(x)$ is transverse to Σ	TB
	222	-8	The sixteenth $\Longrightarrow$ Part of the sixteenth	
	222	-6-7	Replace the phrase beginning "to show" with $\Longrightarrow$ "to find an upper bound for the number of limit cycles for a polynomial vector field on $\mathbb{R}^2$."	JMG
	222	-2	(Shi, 1988) $\Longrightarrow$ (Shi, 1980)	HPR
	223	1	$\lambda = 10^{-200} \Longrightarrow \lambda = -10^{-200}$	HPR
	223	3	unstable foci $\Longrightarrow$ foci	HPR

Chap.	Page	Line	Change	Thanks to
7	245	-8	$\theta_1(t_n) = \alpha_n \Longrightarrow \theta_1(t_n) = \alpha_1$	TB
	251	1	$\Phi(t; xv) \Longrightarrow \Phi(t; x)v$	
	253	-1	$\mu(x, v) \Longrightarrow \mu(x, v(0))$	JGR
	256	3	In equation (7.21) flip the sign of both x's in the matrix	
	259	2	When $\mu_1 < \mu_2 \Longrightarrow$ When $\mu_1 \leq \mu_2$	
	260	-7	of a set $S \Longrightarrow$ of a bounded set S	JGR
	263	-2	$\mu_1 + \mu_2 \leq \mathrm{tr}(Df) \Longrightarrow \mu_1 + \mu_2 \geq \mathrm{tr}(Df)$	
	263	-1	Thus there $\Longrightarrow$ Thus if the spectrum is regular there	
	265	12	then $\mu = \mathrm{Re}(\lambda) \Longrightarrow$ then $\mu = \frac{1}{T}\mathrm{Re}(\lambda)$	
	265	-6	that $\chi(F) \leq \chi(f) \Longrightarrow$ that $\chi(F) \leq \max(0, \chi(f))$	AML, ASD
8	269	-11	that as $\mu \to \infty \Longrightarrow$ that as $\mu \to -\infty$	SS2
	271	-6	$(x_o, \mu_0) \Longrightarrow (x_o, \mu_o)$	
	274	1-2	Replace sentence with "The range of dynamics of the induced vector field f can be as rich as those of g, but may also be simpler."	MS
	274	19	$= Dhf(x; p(\nu)) \Longrightarrow = Dh(x; p(\nu))f(x; p(\nu))$	MS
	274	20	of $(0, 0)$. $\Longrightarrow$ of $(0, 0)$, recall (4.34).	MS
	275	Fig 8.5	$f(x; \nu) \Longrightarrow f(x; \mu)$	
	280	Fig 8.7	$\alpha(\mu) \Longrightarrow m(\mu)$	MS
	280	-1	Using the definition (8.16) of m, $\Longrightarrow$ Using $m(\mu) = f(\xi(\mu); \mu)$,	MS
	289	-1	$1 + \beta + r^2 \Longrightarrow 1 + \beta r^2$	
	290	-6	$g_1(x; \eta(\mu), \mu) \Longrightarrow g_1(x; \eta(x; \mu), \mu)$	
	294	Fig 8.9	of (8.49) for $\Longrightarrow$ of (8.46) for	AA
	294	-7	$b = 1 \Longrightarrow b = -1$	AA
	303	-9	$f : C^3(\Longrightarrow f \in C^3($	
	303	-7	$D_x^2 f(0; 0) \Longrightarrow D_x^2 f(0; 0) = 0$	
9	361	8	$(2n-1)n \Longrightarrow (2n+1)n$	
	362	4	$(2n-1)n \Longrightarrow (2n+1)n$	
	371	-8	$\lvert m \cdot \omega \rvert > c \Longrightarrow \lvert m \cdot \omega \rvert \geq c$	
	371	-7	The set $\mathcal{D}_{c,\tau}$ is a $\Longrightarrow$ The set $\mathcal{D}_{c,\tau} \cap \mathbb{S}^{n-1}$ is a	
	371	-1	$> \frac{d}{\lvert q\rvert^{\tau+1}} \Longrightarrow \geq \frac{d}{2\lvert q\rvert^{\tau+1}}$	
	372	1	with $d = c/\omega_2 \Longrightarrow$ with $d = 2c/\omega_2$	
	372	4	$[0, d/2]$ and $[1- \Longrightarrow [0, d/2)$ and $(1-$	
App	394	3	`meshgrid(-pi,pi/10,pi)` $\Longrightarrow$ `meshgrid(-pi:pi/10:pi)`	JA
Ref	405	Shi	Replace with $\Longrightarrow$ Shi, S. L. (1980). "A Concrete Example of the Existence of Four Limit Cycles for Plane Quadratic Systems." Sci. Sinica 23(2): 153-158.	