Errata for Set-valued, Convex, and Nonsmooth Analysis in Dynamics and Control by Rafal K. Goebel

- p. 27, l. 5, in item (b): ' $x_i \to x$ ' should be ' $x_i \to \overline{x}$ '
- p. 29, l. 11, in Example 2:14, $U: \mathbb{R}^n \to \mathbb{R}^m$ should be $U: \mathbb{R}^n \rightrightarrows \mathbb{R}^m$
- p. 31, l. -7, in Exercise 2.20, ' $x_0 + u_1 + u_2$ ' should be ' $x_0 + u_0 + u_1$ '
- p. 31, l. -1, ' $\liminf_{i\to\infty} f(x_i) \le f(\overline{x})$ ' should be ' $\liminf_{i\to\infty} f(x_i) \ge f(\overline{x})$ '
- p. 50, l. 3, item (ii), ' $A \in \mathbb{R}^{m \times n}$ ' should be ' $A \in \mathbb{R}^{n \times m}$ '
- p. 50, l. 3, item (ii), $C \in \mathbb{R}^m$ and $D \in \mathbb{R}^n$ should be $C \subset \mathbb{R}^m$ and $D \subset \mathbb{R}^n$
- p. 50, l. 8, ' $x = \lambda u$, $y = \lambda v$ ' should ' $x = \alpha u$, $y = \alpha v$ '
- p. 58, the second part of the proof of Proposition 4.20 has inconsistent subscripts and lacks upper limits in sums. The second part of the proof should be:

To show the opposite inclusion, fix $x \in O$ and take any $y \in F_K(x)$. Then, for every $\delta > 0$, there exist $y_\delta \in \operatorname{con} f\left((x+\delta\mathbb{B})\cap O\right)$ arbitrarily close to y. Note that because O is open, for all small enough δ , $x+\delta\mathbb{B}\subset O$. Considering $\delta=i^{-1}$ and large enough i, there exist $y_i\in\operatorname{con} f\left(x+i^{-1}\mathbb{B}\right)$ convergent to y. Each such $y_i=\sum_{k=0}^n\lambda_{i,k}y_{i,k}$ for some $\lambda_{i,k}\in[0,1], \sum_{k=0}^n\lambda_{i,k}=1$, and $y_{i,k}\in f\left(x+i^{-1}\mathbb{B}\right)$. Because f is locally bounded, subject to passing to a subsequence, the sequences $\lambda_{i,k}$ and $y_{i,k}$ converge as $i\to\infty$, to limits λ_k and y_k , and $\lambda_k\in[0,1], \sum_{k=0}^n\lambda_k=1$, and $y_k\in\overline{f\left(x+\delta\mathbb{B}\right)}$ for every $\delta>0$, and so $y_k\in\bigcap_{\delta>0}\overline{f\left(x+\delta\mathbb{B}\right)}$. Also, $y=\sum_{k=0}^n\lambda_ky_k$, so that $y\in\operatorname{con}\bigcap_{\delta>0}\overline{f\left(x+\delta\mathbb{B}\right)}$. Because the sets $(x+\delta\mathbb{B})\cap O$ are decreasing with δ , and for small enough δ they equal $x+\delta\mathbb{B}$, $y\in\operatorname{con}\bigcap_{\delta>0}\overline{f\left((x+\delta\mathbb{B})\cap O\right)}$.

- p. 64, l. -4, ' $u' = (u_1, u'_2, \dots, u'_n)$ ' should be ' $u' = (u'_1, u'_2, \dots, u'_n)$ '
- p. 72, l. 1, ' $\phi_k(t) := x_i + (t t_i)v_0$ ' should be ' $\phi_k(t) := x_i + (t t_i)v_i$ '
- p. 91, l. 18, 'w(x) = A' should be 'w(x) = 0'
- p. 91, l. -16, in Exercise 6.13, ' $\{x \in O \mid V(x) \le r\}$ ' should be ' $\{x \in O \mid w(x) \le r\}$ '
- p. 94, l. 24, in Exercise 6.19, 'conclusions in (c), (e)' should be 'conclusions in (e)'
- p. 102, l. -5, 'Exercise 7.10 or 7.9' should be 'Exercise 7.8 or 7.9'
- p. 106, l. 13, 'such that $z + (v, 0) \in \text{epi } f$ for all $t \geq 0$ ' should be 'such that $z + t(v, 0) \in \text{epi } f$ for all $t \geq 0$ '
- p. 120, l. 8, 'any convergent sequence $(x_i, y_i) \in M$ ' should be 'any convergent sequence $(x_i, y_i) \in \text{gph } M$ '
- p. 120, l. -13, the three-line displayed calculation is nonsense, and it should be:

$$(x - \overline{x}) \cdot (y - \overline{y}) = (1 - \lambda)(x - \overline{x}) \cdot (y - y_1) + \lambda(x - \overline{x}) \cdot (y - y_2)$$

 $\geq 0.$

- p. 136, l. 8, 'which leads to g'(0; v) = v for v > 0. Similar arguments shows g'(0; v) = -v for v < 0.' should be 'which leads to $g^{\circ}(0; v) = v$ for v > 0. Similar arguments shows $g^{\circ}(0; v) = -v$ for v < 0.'
- p. 139, l. 10, 'at almost $t \in [0, T]$ ' should be 'at almost all $t \in [0, T]$ '
- p. 169, l. -7 and l. -5, ' λ ' should be ' α '
- p. 184, l. 4, ' $((t_{j-1}, j], j)$ ' should be ' $((t_{j-1}, t_j], j)$ '
- p. 186, l. -20, 'Example 2.2' should be 'Example 12.4'
- p. 187, l. -12, 'for all $I>i_\varepsilon$ ' should be 'for all $i>i_\varepsilon$ '
- p. 188, proof of Theorem 12.8 uses should not use K as a subscript in j_{K^i} because K is a compact set in the theorem. Once one replaces all K in subscripts with M, in line -2, ' $\phi_i(\cdot, j_K^i)$ ' should be ' $\phi_i(\cdot, j_{M^i})$ ''
- p. 190, l. 5, 'and $H(x) = \emptyset$ otherwise' should be 'and $H(x) = \{x\}$ otherwise'
- p. 192, l. 16, 'Any such solution is also a solution to (12.3)' should be 'Any such solution is also a solution to (12.10)'

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