MAPPING DEGREE THEORY

Graduate Studies in Mathematics 108

Enrique Outerelo, Jesús M. Ruiz
Universidad Complutense de Madrid

TYPOS & COMMENTS

(March 21, 2013)

---

1. Ch. II §4, II.3.4, proof of the Sard-Brown Theorem for smooth mappings (c), p. 65, l. -4 *should read:*

for any $x \in C_i \cap K$ and $y \in K$.

2. Ch. II §4, II.4.3, proof (c), p. 73, l. 14,15 *should read:*

$$E \supset \{(x, u) \in \nu M : \; \|x - z\| < \tfrac{1}{2}\varepsilon, \; \|u\| < \tfrac{1}{6}\varepsilon\},$$

and the latter set is an open neighborhood of $(z, 0)$.

3. Ch. II §5, II.5.3, proof, p. 78, l. -2,-1 *should read:*

$$\begin{aligned} \|f(x) - H_t(x)\| &= \big\|f(x) - \big((1-t)f(x) + tg(x)\big)\big\| \\ &= t\|f(x) - g(x)\| < \varepsilon(x) = \operatorname{dist}(f(x), \mathbb{R}^n \setminus U), \end{aligned}$$

4. Ch. V §4, V.4.1, proof, p. 201, l. 9. The assertion that $\deg(g \times g) = +1$ is right, but notations might be misleading. The point is that g reverses orientations restricted to $f^{-1}(a)$ and restricted to $f^{-1}(b)$, hence the product preserves. Now, what is important here is that *g does the same on both inverse images,* be it preserving or reversing orientations. This is a general fact, because any diffeomorphism h of $\mathbb{S}^{2m-1}$ does on all inverses images what it does on $\mathbb{S}^{2m-1}$, as the following commutative diagram explains.

$$\begin{array}{ccc} \zeta_{\mathbb{S}^{2m-1},x} & \xrightarrow{\equiv} & \zeta_{f^{-1}(a),x} \oplus \zeta_{\mathbb{S}^m,a} \\ {\scriptstyle d_x h}\downarrow & & \downarrow{\scriptstyle d_x h| \oplus \mathrm{Id}} \\ \zeta_{\mathbb{S}^{2m-1},h(x)} & \xrightarrow{\equiv} & \zeta_{h(f^{-1}(a)),h(x)} \oplus \zeta_{\mathbb{S}^m,a} \end{array}$$