

CORRECTIONS TO
Introduction to Smooth Manifolds, Draft Second Edition

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- (2/6/07) **Page 9, statement of Theorem 1.7:** The last B should be \mathcal{B} .
- (2/6/07) **Page 28, statement of Proposition 1.28:** In line 2, change “replace” to “replaced.”
- (2/6/07) **Page 49, statement of Lemma 2.16:** The hypothesis that $0 < r_1$ is unnecessary and should be deleted.
- (2/9/07) **Page 105, second-to-last displayed equation and second-to-last line:** Change \tilde{V} to W (twice).
- (2/9/07) **Page 106, lines 3 and 4 from bottom:** Change W to $\psi(\tilde{V})$ (twice). Also, somewhere in there, add the observation that ψ is already known to be a homeomorphism onto an open subset of \mathbb{R}^k .
- (2/9/07) **Page 107, first line:** Change S to \tilde{S} .
- (3/9/07) **Page 177, Problem 7-9:** Change “vector bundles” to “smooth vector bundles,” “bundle map” to “smooth bundle map,” and “bundle isomorphism” to “smooth bundle isomorphism.”
- (3/9/07) **Page 204, proof of Prop. 8.28, third line:** Change “suppose ω is closed” to “suppose (b) holds.”
- (3/9/07) **Page 204, proof of Prop. 8.28, fifth line:** Change “any coordinate chart $(U, (x^i))$ ” to “any coordinate chart $(V, (x^i))$ with $V \subseteq U$.”
- (3/9/07) **Page 204, just below the last displayed equation:** Change (6.6) to (6.7).
- (6/3/07) **Page 210, Problem 8-8(b):** Change “Proposition 5.16” to “Lemma 7.17.”
- (4/25/07) **Page 238, Proposition 9.28(b):** The last η is missing a d , so the formula should read
- $$d(\omega \wedge \eta) = d\omega \wedge \eta + (-1)^k \omega \wedge d\eta.$$
- (5/6/07) **Page 240, Proposition 9.29, property (ii):** The last η is missing a d as on page 238.
- (4/8/07) **Page 269, Problem 10-3, last displayed equation:** Change $t \geq 0$ and $t \leq 0$ to $t \geq t_0$ and $t \leq t_0$, respectively
- (4/8/07) **Page 270, Problem 10-4:** The hint should refer to Problem 10-3.
- (6/3/07) **Page 270, Problem 10-11:** Delete “the” before “both.”
- (4/10/07) **Page 270, Problem 10-12:** Assume that M and S are connected.
- (6/3/07) **Page 270, Problem 10-13:** Change the last phrase to “yet \mathbb{R} is complete in the metric induced from the Euclidean metric on \mathbb{R}^2 .”

- (4/11/07) **Page 285, last paragraph:** The first sentence should read, “Conversely, if the hypothesis of (b) is satisfied, then for each $p \in M$ there is an ε such that (11.10) holds for $|t| < \varepsilon$, and we have”
- (5/17/07) **Page 302, Problem 11-10, line 5:** Change $\{0\} \times M$ to $\{0\} \times \partial M$.
- (4/13/07) **Page 302, Problem 11-10, lines 8 and 9:** In the definition of “inward-pointing,” add the condition that $X \notin T_p \partial M$.
- (6/4/07) **Page 302, Problem 11-10(b):** Change the definition of \mathcal{D}_δ to
- $$\mathcal{D}_\delta = \{(t, p) : p \in \partial M, 0 \leq t < \delta(p)\}.$$
- (6/3/07) **Page 303, Problem 11-10(c):** Change the statement to “Show that δ can be chosen so that θ is an embedding,” and add the following hint: [Hint: Make sure $\delta(p)$ is less than half of the first time the integral curve starting at p hits the boundary (if it ever does).]”
- (6/4/07) **Page 303, Problem 11-10(d):** No change (eliminate the correction posted earlier).
- (4/25/07) **Page 347, line 5:** After the definition of what it means for a p -form to annihilate D , add the following sentence: “In the case $p = 0$, only the zero function annihilates D .”
- (5/6/07) **Page 383, just below the statement of Prop. 15.19:** Instead of “*Proof*,” it should say “**Exercise**.”
- (5/4/07) **Page 398, proof of Proposition 16.11, last paragraph:** Change “(i) and (i)” to “(i) and (ii).”
- (5/8/07) **Page 416, Problem 16-1:** Replace the second sentence of the problem by the following: “Show that X has an open subset homeomorphic to \mathbb{S}^{n-1} , and a point that is contained in the boundary of every subset.”
- (6/4/07) **Page 419, Problem 16-19:** Change $SU(n) \times \mathbb{R}^{n^2}$ to $SU(n) \times \mathbb{R}^{n^2-1}$.
- (5/6/07) **Page 420, Problem 16-26(a):** Add the hypothesis that G is connected.
- (5/17/07) **Page 425, second paragraph, last four lines:** Change $\mathbb{R}^{n-1} \times J_c$ to $J_c \times \mathbb{R}^{n-1}$ and $U \times J_c$ to $J_c \times U_c$. Also, change every U in these four lines to U_c (four times in all).
- (5/17/07) **Page 426, third line from the end of Step 2:** Change $F|_V$ to $F|_Y$.
- (5/17/07) **Page 429, line 8:** Change \mathbb{R}^{nm+n} to \mathbb{R}^{nm+m} .
- (5/17/07) **Page 432, proof of Proposition 17.13, line 7:** Change $\varphi(NM \cap U)$ to $\tilde{\varphi}(NM \cap \pi^{-1}(U))$.
- (5/17/07) **Page 437, Proposition 17.20:** Add the hypothesis that S is a smooth manifold.
- (5/17/07) **Page 438, line 9:** Change $T_z N$ to $T_z X$.
- (5/17/07) **Page 438, line 10:** Change $TF_s(T_x X)$ to $TF_s(T_x N)$.
- (5/17/07) **Page 439, Problem 17-4:** Change \mathbb{R}^m to \mathbb{R}^n .

(5/17/07) **Page A-56, Theorem A.77:** We need a slightly stronger statement of the change of variables theorem:

Theorem A.77 (Change of Variables). *Suppose A and B are open domains of integration in \mathbb{R}^n , and $G: A \rightarrow B$ is a bijective smooth map with smooth inverse. For every bounded continuous function $f: B \rightarrow \mathbb{R}$,*

$$\int_B f \, dV = \int_A (f \circ G) |\det DG| \, dV.$$