MATH 4220/6220 Fall 2011

ERRATA

Guillemin and Pollack, *Differential Topology*

p. 5	#4	$\lvert x\rvert < a$
p. 6	#8	hyperboloid
p. 7	#18b	$g(x) = f(x-a)f(b-x)$; $h(x) = \frac{\int_{-\infty}^{x} g(t)\,dt}{\int_{-\infty}^{\infty} g(t)\,dt}$
p. 12	#8	hyperboloid, and delete the parentheses
p. 16	line 16	in $f(X) \subset Y$
p. 24	line –11	"In particular, taking X to be ..."
p. 25	#6	This is the definition of homogeneity of degree m; 0 is the only possible critical value
p. 27	#11(a)	Remark: This is really a special case of Exercise $\underline{6}$.
	#13	Delete "of" at the end of the first line.
p. 28	line 9	$g\circ f : U \to \mathbf{R}^\ell$
p. 35	line 12	Z needs to be *closed*
p. 45	#6	simply connected
p. 48	#22	$r_i = \lvert x - x_i\rvert$
p. 51	line –9	$g(x, \frac{1}{t}v)$
p. 52	line –15	exercise 15
p. 55	#11	$f^{-1}(a)$ should be $\{x \in X : F(x,v) = a \text{ for some } v\}$. The HINT should read as follows. Show first that $F^{-1}(a)$ lies in a compact subset $\{(x,v) : \lvert v\rvert \le \text{constant}\}$ of $T(X)$: for if $F(x_i, v_i) = a$ and $\lvert v_i\rvert \to \infty$, pick a subsequence .... Now use the proof of the Stack of Records Theorem (p. 26, #7) to show that $F^{-1}(a)$ is indeed finite.
p. 56	#15	A and B are disjoint, closed subsets.
p. 61	line 6	$Z = \phi^{-1}(0)$
	line –6,–5,–3	dg_s and $d(\partial g)_s$ map to $\mathbf{R}^\ell$
p. 62	line 1	$\ker dg_s$ has dimension $k-\ell$, $\ker d(\partial g)_s$ has dimension $k-\ell-1$
p. 64	#10	$df_z(\vec{n}(z)) < 0$
p. 66	#4	$\lvert x\rvert < a$
p. 70	line –10	$S \to Y^\epsilon$
p. 75	#7	affine subspace V; the map given in the hint should be $\mathbf{R}^\ell \times S \times \mathbf{R}^N \to \mathbf{R}^N$, defined by $(t,v,a) \mapsto t\cdot v + a$
	#9	$f : \mathbf{R}^k \to \mathbf{R}$
p. 76	#18	$X \subset T(X)$ refers to $X \times \{0\}$
p. 83	#5	contractible; there still is a dimension 0 anomaly, so one should require $\dim X > 0$
	#6	contractible
p. 84	#9	$I_2(f,Z) = 0$, $p \notin f(X) \cup Z$
p. 85	#15	closed manifold C
	#16	Consider the submanifold $F^{-1}(\Delta)$

	line –10	Corollary to Exercises 18 and 19, obviously
p. 90	#9	Not so fast! To apply Exercise 8, we must use the fact that X is a compact hypersurface to produce a ray intersecting X (and transversely).
p. 91	#11	$\overline{D}_1$ is compact; "parametrization" in last line.
p. 99	line 8	sign
p. 106	#18	(b) nonzero normal vectors
	#21	What does it mean to define a manifold with boundary by independent functions?
	#23	X orientable and connected
p. 117	#9	$g(t+2\pi) = g(t) + 2\pi q$
p. 131	#4	"is" stable
p. 138	#1	$h_t(z) = e^t z$
p. 139	#7	$\vec{v}_1$ should have only nondegenerate zeroes inside U
p. 140	#12	In the last formula, g^{ij}, not g_{ij}, where $(g^{ij}) = (g_{ij})^{-1}$
	#14a	the matrix (g^{ij}) is nonsingular
p. 141	#17	sum of the indices of f at its critical points
p. 144-5	#3	The new map will only agree with f on the complement of a slightly larger ball, so it's not quite an extension
p. 147	#3	$f(tx) = g_t(x)$
	#6	Replace ρ with β, b with a in the last three lines
	#8	"Now apply the corollary of the special case" should be after the right parenthesis
p. 148	#11	ρ is not a submersion, but the rest is right
p. 155	line 17	$(T^\pi)^\sigma = T^{\sigma\circ\pi}$
p. 164	line –10	$df_I = df_{i_1} \wedge \cdots \wedge df_{i_p}$
p. 166	line –3	X is a k-dimensional oriented manifold with boundary
p. 170	line 2	$f_1 \circ h,\ f_2 \circ h,\ f_3 \circ h$
	line 8	$\vec{F} = (f_1, f_2, f_3) \circ h$
p. 173	#9	The reference should be to Exercise 7
p. 174-5		1, 2, 3 magically become (a), (b), (c)
p. 187	#11	The reference should be to Exercise 12
	#13	We need Z_0 and Z_1 oriented, and the definition of cobordism needs to be updated to $\partial W = -Z_0 \times \{0\} \cup Z_1 \times \{1\}$.
p. 188	line 5	Y should be connected (cf. the proof on p. 191)
p. 190		In the lemma, X, Y should be compact, and $\int_S$ should be $\int_X$; in the proof, U should be a connected neighborhood of y
p. 191	#1	$\frac{x}{x^2+y^2}\, dy$
p. 194	#7	last line: Identify c.
p. 195	line –18	parallelepiped
p. 200	#8	Delete the $\frac{1}{2}$ before the Hessian matrix