

Errata for *Surgery on compact manifolds* by C.T.C. Wall  
Second Edition, Edited by Andrew Ranicki  
Mathematical Surveys and Monographs, A.M.S. (1999)

Please let me know of any further misprints/errors by e-mail to a.ranicki@ed.ac.uk  
Thanks to Tibor Macko and Qayum Khan.

A.A.R. 1.8.2011

- p. xi l. -4 Strictly speaking, the actual disproof of the manifold Hauptvermutung was first obtained by Kirby and Siebenmann in 1969 – see the 1967 papers of Casson and Sullivan published in 1996 in the Hauptvermutung Book [R11] <http://www.maths.ed.ac.uk/~aar/books/haupt.pdf> for what they actually did. The prehistory of the disproof is given in the paper of Novikov *Classical and modern topology. Topological phenomena in real world physics* GAFA 2000 (Tel Aviv, 1999), Special Volume, Part I, 406–424, e-print <http://arXiv.org/abs/math-ph/0004012>  
Also, there is an account of the Hauptvermutung by Rudyak in the e-print <http://arXiv.org/abs/math.AT/0105047>
- p. 4 l. 9  $\sigma_n S(\alpha) = 0$
- p. 8 l. -16 Insert *for a finite simplicial complex X* before *every normal map*
- p. 15 l. -10 Replace by
- $$H_{k+1}(H \cup \partial N_0, \partial N) \rightarrow H_{k+1}(\phi) \rightarrow H_{k+1}(\phi_0) \rightarrow H_k(H \cup \partial N_0, \partial N).$$
- p. 20 l. 5  $\pi_1(U - K, \partial U)$
- p. 20 ll. 9, 25 “Corollary 2.4.2” should be “second corollary (not indexed) to Theorem 1.7”
- p. 20 l. 13 “Now let  $S^1$  be a circle in  $C := S^m - K$ ”
- p. 20 ll. 17,18,25,26 replace the 6 occurrences of the variable  $n$  with  $m$
- p. 20 l. 17 “Thus if any  $\pi_i(C)$  with  $2 \leq i \leq m - 3$ ”
- p. 24 l. 1 “ $K \times K^*$ ”
- p. 29 l. 13 “ $Z = Y \cup Y'$ ”
- p. 35 l. -8 “ $\partial_n \pi \xrightarrow{i} \delta_n \pi$ ”
- p. 35 l. -7 “ $L_{m-1}(\partial_n \pi)$ ”
- p. 36 l. 12 “Given an object  $P$  of type  $\mathbf{2}^2$ ”
- p. 40 l. -15 “ $H_k(U, U \cap M) \cong H_k(U \cup M, M) \rightarrow K_k(N, M)$ ”

- p. 40 l. -13 “ $s$ -base on  $K_k(N, M)$ ”
- p. 41 l. 3 “hence so is the upper  $\phi^*$ .”
- p. 43 l. 2 “ $(Y \times I; Y \times 0 \cup X \times I, Y \times 1)$ ”
- p. 54 l. 4 Replace by  $\phi : (M; \partial_- M, \partial_+ M) \rightarrow (X \times I; X \times 0 \cup \partial X \times I, X \times 1)$
- p. 55 l. -5 “ $s$ -cobordism of  $\partial_+ M$  to  $\partial_+ M'$ ”
- p. 59 l. 12 “this is obvious *a priori*, as  $\partial U$  is”
- p. 65 l. 10 “Hence  $A \oplus A^{-1} \in RU(\Lambda)$ ”
- p. 68 l. 21 “since by (6.3)  $RU(\Lambda)$  is a normal subgroup”
- p. 69 l. 1 “This replaces  $X \times I$  by its boundary-connected sum with  $r$  copies of  $S^k \times D^{k+1}$ ”
- p. 75 l. 4 “We wish to do surgery relative to  $M_-$ ”
- p. 93 l. -3 “ $Y' = Y_0 \cup_{\partial H} H$ ”
- p. 96 l. -4 “a map  $\Omega : Y \rightarrow s_n K$ ”
- p. 97 l. 7 “ $\Omega_{\alpha, n, n+1} : Y_{\alpha, n, n+1} \rightarrow s_n K_{\alpha, n, n+1} = K_\alpha$ ”
- p. 97 l. 19 “we may suppose by induction that for all  $\beta \subsetneq \alpha$ ”
- p. 98 l. 2 “This proves exactness at  $\delta_n K$ ”
- p. 98 l. 3 “Exactness at  $K$  follows since  $d_* j_* = 0$ ”
- p. 101 l. -2 “Now suppose  $m$  is odd; write  $m = 2k - 1$ ,  $k \geq 3$ ”
- p. 107 l. -20 “bordism class  $\chi$  of  $(M, \phi, F)$ ”
- p. 108 l. -12 “ $1 \leq i < n$ ”
- p. 111 l. -19 “If  $m = n + 3$ , the map is surjective.”
- p. 111 l. -1 “Then  $N'$ , and the composite”
- p. 112 l. 2 “Moreover, if  $\theta'$ ”
- p. 112 l. 6 “normal map  $(N'', \phi'', F'')$ ”
- p. 112 l. 11 “surgery obstruction  $\theta'$  for  $N'$ ”
- p. 113 l. -6 “and of  $\mathcal{T}^{\text{Diff}}(X, \partial_n X)$ ”
- p. 114 l. 7 “since  $\tau_M \oplus \nu' \cong \phi^*(\tau_X \oplus \varepsilon^k)$ ”
- p. 114 l. 12 “defines a fibre homotopy trivialization  $h$  of  $\nu'$ ”

- p. 114 l. -15 “ $\mathcal{T}^{PL}(X \times I, X \times \partial I) \rightarrow$ ”
- p. 114 l. -12 “standard structure on  $X \times \partial I \cup \partial_n X \times I$ ”
- p. 115 l. 8 “an element  $\alpha$  of  $[\Sigma(X/\partial_n X), G/PL]$ ”
- p. 120 l. -14 “Then  $(M, E_0)$  need not”
- p. 121 l. -15 “ $V \simeq C \cup M(p) \rightarrow$ ”
- p. 122 l. 1 “(locally flat PL) embedding”
- p. 122 l. -9 “ $\tau_L \oplus \phi^*(i^* \nu_{M(p)} \oplus \xi)$ ”
- p. 123 l. 7 “Since  $|Y|$  is homotopy”
- p. 123 ll. 9, 10 replace  $A'$  with  $A$
- p. 123 l. -17 “homotopy equivalent to  $|Y|$ ”
- p. 124 l. -1 “ $(h|C)_*$ ”
- p. 125 l. 6 “ $f(|M|)$ ”
- p. 125 l. 16 “ $|M|$ ”
- p. 125 l. -9 “inducing  $A'$  over  $M'$ ”
- p. 125 l. -7 “glueing along  $B = A' \times \partial(V \times 1)$  a copy of  $B \times I$ ”
- p. 126 l. -10 “ $f : M \rightarrow \delta_{n+1}V$ ”
- p. 131 l. -4 Replace  $M^{n-1} \rightarrow V^{n+q-1}$  by  $E \rightarrow F$ , where  $(F, E)$  is the complement of the simple Poincaré embedding  $N \rightarrow W$ , such that  $F \cup M(p_E) \simeq W$  with  $p_E : E \rightarrow N$  the projection of the normal  $(q-1)$ -spherical fibration and  $F \cap M(p_E) = E$ .
- p. 131 ll. -8, -9, p. 133 footnote Replace  $p : X \rightarrow Y$  by  $P : X \rightarrow Y$
- p. 133 l. 14 “relative to  $M$ ”
- p. 133 l. 15 “induced on  $N$ ”
- p. 133 ll. 18, 19 “ $D^q$ -bundles”
- p. 133 l. 18 “ $N' \subset W$ ”
- p. 133 l. 19 The surgery problem for  $D^2$ -bundles is induced from a relative one for Poincaré tetrads, namely  $\partial_1$  of the surgery problem
- $(W \times I; A', \text{cl. } (W \times 1 - A'), W \times 0) \rightarrow (M(W \simeq M(p) \cup C); M(p), C, W \times 0)$
- with normal bundle  $\nu_{W \times I}$  and canonical stable trivialization of  $\tau_{W \times I} \oplus \nu_{W \times I}$  and  $A'$  the total space of  $\nu_{N' \subset W}$ . This represents (cf. p. 96) a tetrad object in  $L_{n+q+1}(\Phi)$  with the simple homotopy equivalence on  $\partial_3$  being the identity  $W \times 0 \rightarrow W \times 0$ . Of course,  $\Phi$  is a triad. (Khan)

- p. 133 l. 21 “ $L_{n+q+1}(\Phi) \rightarrow L_{n+q}(A \rightarrow B) \rightarrow L_{n+q}(C \rightarrow D)$ ”
- p. 133 l. -12 Replace by “The pullback  $D^q$ -bundle  $(M, E)$  over  $N$  induced by the universal fibration for  $A \rightarrow B$ ”
- p. 133 l. -10 “in the kernel”
- p. 134 l. 8 “submanifold  $M' \subset V^{n+q}$ ”
- p. 134 l. -3 “Now attach handles”
- p. 135 l. 2 “together  $W_1, W_2$  (as in proof of (11.3)), and the same disc bundle”
- p. 136 l. 7 “ $r(y) = r(x)$ ”
- p. 137 l. -3 “*nonorientable*”
- p. 142 l. -03 “along  $V'_1 \times 1$ ”
- p. 143 l. 12 “split into  $V_1$  and  $V_2 = X'\{2\}$ ”
- p. 144 l. 15 Replace 2 occurrences of “ $\delta_2 U$ ” with “ $\delta_2 W$ ”
- p. 144 l. -6 Replace “By (12.1)” by “By (10.3)”
- p. 145 l. 11 “ $\cup(M' \times 1)$ ”
- p. 146 l. 5 “ $C = \pi(C)$ ”
- p. 146 l. -12 “(3.1) gives a third sequence  $(i, j, \partial_2)$ ”
- p. 146 l. -5 “and  $p_0 r(x)$ ”
- p. 146 footnote “case  $A = B, C = D$ ”
- p. 159 l. 11 “ $H_k(A^+, \widetilde{M}; \Lambda')$ ”
- p. 160 l. -1 “multiplication by  $g_0$ ”
- p. 161 l. 1 Should read *In one case*
- p. 161 l. -12 “note that”
- p. 161 l. -5 “the lower sequence from (3.1)”
- p. 162 l. -5 “ $H_{k+1}(\widetilde{V} \times I, \widetilde{V} \times 0 \cup \widetilde{N}; \Lambda')$ ”
- p. 163 l. -12 “a double point of  $f_1 : S^k \rightarrow M$ ”
- p. 164 l. 11 “with fundamental group  $\pi'$ ”
- p. 164 l. 21 “ $\mu_0(e_i) = b_i$ ”
- p. 165 l. 9 “ $M_0 = M - \bigcup f_i(S^k \times \text{Int } D^{k+1})$ ” and “ $\widetilde{M}_0 = \widetilde{M} - \text{Int}(U^+ - U^-)$ ”

- p. 166 l. -14 Replace “for if” by “for”
- p. 167 l. -24 “disjoint embeddings  $\tilde{f}_i : (D^{k+1}, S^k) \times D^{k+1}$ ”
- p. 167 l. -22 “embeddings  $\tilde{g}_i$ ”
- p. 167 l. -21 “of  $\tilde{f}_i$  to  $\tilde{g}_i$ ”
- p. 167 l. -15 “spheres  $f_i(S^k \times 0) \subset M$ ”
- p. 167 l. -4 “ $\tilde{f}_1, \tilde{f}_2$ ”
- p. 168 l. -16 “ $A^- \cup \tilde{N}$ ”
- p. 169 l. 2 unlabelled reference “(3)” to second sequence on p. 168
- p. 169 l. 12 “ $N^{2k+1}$ ” and “ $\partial N$ ”
- p. 173 l. 3 “ $L_3(\mathbf{Z}_2^+)$ ”
- p. 173 l. -10 *established.*
- p. 186 l. -1 Remove  $a$
- p. 206 l. 11 Should read  $[P_n(\mathbf{R}), Y] = [P_5(\mathbf{R}), Y]$
- p. 221 l. -4 Should read *of a representation*
- p. 233 l. 16  $H^3(T^n; \mathbf{Z}_2) \cong$
- p. 240 l. -9 “Davis [D1]”
- p. 255 l. -2 “*homotopic to a PL homeomorphism through homeomorphisms*”
- p. 258 l. 21 The reference to Kirby [K8] should be replaced by a reference to R. Kirby and L.C. Siebenmann, *Normal bundles for codimension 2 locally flat imbeddings*, Geometric topology, Park City, Utah, 1974, pp. 310–324. Lecture Notes in Math., Vol. 438, Springer, Berlin (1975).
- p. 276 l. 1 Replace  $(C, \psi)$  by  $(C, \phi)$