Errata for Algebraic L-theory and topological manifolds by Andrew Ranicki Cambridge Tracts in Mathematics 102, CUP (1992)

This list contains corrections of misprints/errors in the book, and some additional material and references. Please let me know of any further misprints/errors by e-mail to a.ranicki@ed.ac.uk

A.A.R. 28.1.2018

p. 6 l. 18 interpreted

p. 7 l. 17 universal

p. 15 l. –3 $\nu_M - (f^{-1})^*\nu_N$

p. 33 l. 16 $\delta\phi_0 f^*$ should be $\delta\phi_0$

p. 34 l. 2 $\delta\psi_0 f^*$ should be $\delta\psi_0$

p. 38 l. 2 "An algebraic normal complex is . . . "

p. 40 l. 12 In the definition of $(f, b)_\%$ should have

$$(\phi, \chi) \to (f^\%(\phi), \widehat{f}^\%(\chi) + \widehat{f\phi_0}^\%(S^n b))$$

p. 40 l. –8 In Definition 2.4 (ii) the second term in the second equation should be $\widehat{\delta\phi}_0(S^n\delta\gamma)$ and not $(\delta\phi_0, \phi_0)^\%(S^n\delta\gamma)$.

p. 43 l. –2 Need "n-dimensional (symmetric, quadratic) Poincaré pairs"

p. 44 l. 16 Should have "$\delta\phi_s = \gamma_{-n+s}$".

p. 44 l. –2 "n-dimensional (normal, symmetric) pair"

p. 45 l. 7 "sends the chain bundle $S^{n+1}\delta\gamma \in \widehat{Q}^{n+1}(D^{n+1-*})$"

p. 45 l. 17 "defined in 2.6 (i)" instead of 2.8 (i)

p. 45 l. 20 "$(0 \to C, ((\phi, \gamma, \chi), 0))$" instead of $(C \to 0, (0, (1 + T)))$

p. 51 l. 12 A closed subcategory $\mathbb{C} \subseteq \mathbb{B}(\mathbb{A})$ is required to be invariant under T.

p. 51 l. 16 Warning: the choice of terminology here is rather poor. A chain complex C is "$\mathbb{C}$-contractible" if it is in $\mathbb{C}$, so in general C is not contractible !

p. 60 l. 4 for $* \geqslant 0$

p. 64 l. –5 Replace

$$\begin{cases}\mathbb{B}(\mathbb{A})^*[K] \;=\; \mathbb{B}(\mathbb{A}^*[K]) \longrightarrow \mathbb{B}(\mathbb{A})_*(K) \;=\; \mathbb{B}(\mathbb{A}_*(K))\;;\; C \longrightarrow C^*[K] \\ \mathbb{B}(\mathbb{A})_*[K] \;=\; \mathbb{B}(\mathbb{A}_*[K]) \longrightarrow \mathbb{B}(\mathbb{A})^*(K) \;=\; \mathbb{B}(\mathbb{A}^*(K))\;;\; C \longrightarrow C_*[K]\end{cases}$$

by

$$\begin{cases}\mathbb{B}(\mathbb{A}^*[K]) \longrightarrow \mathbb{B}(\mathbb{A}_*(K))\;;\; C \longrightarrow C^*[K] \\ \mathbb{B}(\mathbb{A}_*[K]) \longrightarrow \mathbb{B}(\mathbb{A}^*(K))\;;\; C \longrightarrow C_*[K]\end{cases}$$

p. 60 l. 6 for $* \geqslant 0$

p. 64 l. 4 Remove "additive" from "additive functors".

p. 66 l. –1 "Proposition 2.7"

p. 67 l. –7 Add to Remark 4.10

"(i) The *open star* of a simplex $\sigma \in K$ is

$$\mathrm{st}_K(\sigma) \;=\; \{\tau \in K \,|\, \tau \geq \sigma\}\;.$$

Note that $K \backslash \mathrm{st}_K(\sigma)$ is a subcomplex of K: if $\lambda \in K$ does not have σ as a face, and $\mu \in K$ is a face of λ, then μ does not have σ as a face. For any finite chain complex C in $\mathbb{A}_*[K]$ and $\sigma \in K$ projection defines a chain map in $\mathbb{A}$

$$\partial_\sigma \;:\; C_*[K] \to C_*[K, K\backslash \mathrm{st}_K(\sigma)]$$

with $C_*[K, K\backslash \mathrm{st}_K(\sigma)]$ the quotient complex of $C_*[K]$ defined by

$$C_*[K, K\backslash \mathrm{st}_K(\sigma)]_r \;=\; \sum_{\tau \geq \sigma} C[\tau]_{r-|\tau|}\;.$$

(ii)"

p. 68 ll. 12,13,14 Remove the definition of $\mathrm{st}_K(\sigma)$.

p. 68 l. –11 For the chain complex $\underline{\mathbb{Z}}$ in $\mathbb{A}(\mathbb{Z})_*[K]$ of Example 4.5 and any $\sigma \in K$ the $\mathbb{Z}$-module chain map of (i)

$$\partial_\sigma \;=\; \text{projection} \;:\; \underline{\mathbb{Z}}_*[K] \;=\; \Delta(K) \to \underline{\mathbb{Z}}_*[K, K\backslash \mathrm{st}_K(\sigma)] \;=\; \Delta(K, K\backslash \mathrm{st}_K(\sigma))$$

induces $\mathbb{Z}$-module morphisms

$$\partial_\sigma \;:\; H_*(K) \;=\; H_*(K') \to H_*(K, K\backslash \mathrm{st}_K(\sigma)) \;=\; H_{*-|\sigma|}(D(\sigma,K), \partial D(\sigma,K))\;.$$

p. 69 l. 4 Add:

"If $|K|$ is an oriented n-dimensional homology manifold with fundamental class $[K] \in H_n(K)$ then for each $\sigma \in K$ $(D(\sigma,K), \partial D(\sigma,K))$ is an oriented $(n-|\sigma|)$-dimensional homology manifold with boundary, with fundamental class

$$\partial_\sigma[K] \;=\; [D(\sigma,K)] \in H_n(K, K\backslash \mathrm{st}_K(\sigma)) \;=\; H_{n-|\sigma|}(D(\sigma,K), \partial D(\sigma,K))\;.$$

''

p. 72 l. –5 d''

p. 75 l. 12 $d_{TM}(\tau,\sigma) = d_{TM(\sigma)}$ if $\sigma = \tau$

p. 75 l. 14 replace $\tau = \delta_i\sigma$ by $\sigma = \partial_i\tau$

p. 80 l. –1 symmetric Poincaré

p. 85 l. –3 $M \otimes_{[R,K]} N = M \otimes_{\mathbb{A}\,[R,K]} N$ and $M \otimes_{(R,K)} N = M \otimes_{\mathbb{A}\,(R,K)} N$ are R-module chain complexes

p. 88 l. 6 Add footnote
"See Proposition 4.1 of A.Ranicki, *Singularities, double points, controlled topology and chain duality*, Documenta Mathematica 4, 1–59 (1999) for the expression of the chain dual of an (R,K)-module chain complex C as

$$T(C) \;=\; \mathrm{Hom}_R(\mathrm{Hom}_{(R,K)}(\Delta(K;R)^{-*},C),R)\ ,$$

which can also be expressed as $\mathrm{Hom}_R([C]_*[K],R)$."

p. 89 l. –6 Replace "From now on, the (R,K)-module chain complex $[C \boxtimes_R C][K] = C \otimes_{(R,K)} C$ will be replaced by the (R,K)-module chain equivalent complex $(C \boxtimes_R C)(K)$." by
"Note that for any (R,K)-module chain complex C there is an identification of R-module chain complexes

$$[C]_*[K] \;=\; \mathrm{Hom}_{(R,K)}(\Delta(K;R)^{-*},C)$$

and also identifications of $\mathbb{Z}[\mathbb{Z}_2]$-module chain complexes

$$\begin{aligned} C \otimes_{(R,K)} C \;&=\; \mathrm{Hom}_{(R,K)}(TC,C) \\ &=\; [C \boxtimes_R C]_*[K] \\ &=\; \mathrm{Hom}_{(R,K)}(\Delta(K;R)^{-*},C \boxtimes_R C)\ .'' \end{aligned}$$

p. 90 l. 10 Replace Definition 8.2 by
"Definition 8.2 (i) Given an (R,K)-module chain complex C define for each $\sigma \in K$ the $\mathbb{Z}[\mathbb{Z}_2]$-module chain map

$$\partial_\sigma \;=\; \text{projection}\;:\; C \otimes_{(R,K)} C \;=\; [C \boxtimes_R C]_*[K] \to [C \boxtimes_R C]_*[K, K\backslash \mathrm{st}_K(\sigma)]$$

(as in Remark 4.10 (i)) with

$$[C \boxtimes_R C]_*[K, K\backslash \mathrm{st}_K(\sigma)]_n \;=\; \sum_{\lambda \geq \sigma, \mu \geq \sigma} (C(\lambda) \otimes_R C(\mu))_{n-|\lambda \cap \mu|}$$

and a $\mathbb{Z}$-module projection chain map

$$[C \boxtimes_R C]_*[K, K\backslash \mathrm{st}_K(\sigma)] \to S^{|\sigma|}C(\sigma) \otimes_R [C][\sigma]\ .$$

(ii) Given an n-dimensional $\begin{cases}\text{symmetric}\\ \text{quadratic}\end{cases}$ complex $\begin{cases}(C,\phi)\\ (C,\psi)\end{cases}$ in $\mathbb{A}(R,K)$ define for each $\sigma\in K$ an $(n-|\sigma|)$-dimensional $\begin{cases}\text{symmetric}\\ \text{quadratic}\end{cases}$ pair in $\mathbb{A}(R)$

$$\begin{cases}(C,\phi)[\sigma] \;=\; (i[\sigma]\colon \partial[C][\sigma]\to [C][\sigma], \partial_\sigma(\phi))\\ (C,\psi)[\sigma] \;=\; (i[\sigma]\colon \partial[C][\sigma]\to [C][\sigma], \partial_\sigma(\psi))\end{cases}$$

with

$$i[\sigma] \;=\; \text{inclusion} \;:\; \partial[C][\sigma]_r \;=\; \sum_{\tau>\sigma} C(\tau)_r \longrightarrow [C][\sigma]_r \;=\; \sum_{\tau\geq\sigma} C(\tau)_r$$

such that $\operatorname{coker}(i[\sigma]) = C(\sigma)$."
Add footnote
"I am grateful to Frank Connolly for pointing out that the definition of ∂_σ in the original 1992 edition of the book was wrong."

p. 90 l. −2 Replace '$\partial_\sigma : C(K)\to S^{|\sigma|}C(\sigma)$' by "

$$\partial_\sigma = \text{projection} : C(K)\simeq \Delta(K)\to S^{|\sigma|}C(\sigma)\simeq \Delta(K, K\backslash \mathrm{st}_K(\sigma))$$

"

p. 93 l. −1 It should be noted that for a connected oriented n-dimensional pseudomanifold K the composite

$$H^n(K\times K) \xrightarrow{\Delta^*} H^n(K) \xrightarrow{[K]\cap -} H_0(K) \;=\; \mathbb{Z}$$

sends any element $x\in H^n(K\times K)$ with $\langle x, \Delta([K])\rangle = 1\in\mathbb{Z}$ to the Euler characteristic of K

$$[K]\cap \Delta^*(x) \;=\; \chi(K)\in\mathbb{Z}\ .$$

If K admits a geometric Thom class $U\in H^n(K\times K, K\times K\backslash\Delta)$ then U has image the Euler number of the homology tangent bundle τ_K of K

$$\Delta^* j^*(U) \;=\; \chi(\tau_K)\in H^n(K) \;=\; \mathbb{Z}\ ,$$

and $x = j^*(U)\in H^n(K\times K)$ is such that $\langle x, \Delta([K])\rangle = 1\in\mathbb{Z}$. Thus if K is a homology manifold

$$\chi(K) \;=\; \chi(\tau_K)\in H^n(K) \;=\; H_0(K) \;=\; \mathbb{Z}\ .$$

(For a differentiable manifold K this is proved in Milnor and Stasheff [111, pp. 124-130]).

p. 99 l. 10 $\phi(x)(x)\in \widehat{H}^0(\mathbb{Z}_2;R)\subseteq \widehat{H}^0(\mathbb{Z}_2;R[\pi])$ $(x\in C^0)$

p. 103 l. –1 Use the Pontrjagin-Thom isomorphism to represent

$$\rho_X \in \pi^s_{n+k}(T(\nu_X)) \;=\; \pi^s_{n+k}(D(\nu_X),S(\nu_X)) \;=\; \Omega^{fr}_{n+k}(D(\nu_X),S(\nu_X))$$

by a map $(W,\partial W) \to (D(\nu_X),S(\nu_X))$ from a framed $(n+k)$-dimensional manifold. The composite

$$(W,\partial W) \to (D(\nu_X),S(\nu_X)) \to X \to K'$$

can be approximated by a simplicial map, and by the homotopy extension property of a Hurewicz fibration it may be arranged for this simplicial map to also factor in this way. The inverse images of the dual cells $D(\sigma,K) \subset K'$ $(\sigma \in K)$ define a K-dissection $\{(W[\sigma],\partial W[\sigma])\,|\,\sigma \in K\}$ of $(W,\partial W)$ with each $W(\sigma)$ an $(n+k-|\sigma|)$-dimensional framed manifold. Thus each $(X[\sigma],\partial X[\sigma])$ is an $(n-|\sigma|)$-dimensional normal pair, justifying the statement that the n-dimensional normal complex $\widehat{\sigma}^*(X)$ is defined in $\mathbb{A}(R,K)$.

p. 104 l. 5 symmetric (not normal, in general)

p. 106 l. 11 $a+bT \to a \pm b$

p. 107 l. 2 Replace display by:
“The quadratic L-theory assembly maps

$$\begin{aligned} A \;:\; H_n(B\mathbb{Z}_2;\mathbb{L}_\bullet(\mathbb{Z})) \;&=\; \sum_{p+q=n} H_p(B\mathbb{Z}_2;L_q(\mathbb{Z})) \\ \to L_n(\mathbb{Z}[\mathbb{Z}_2]) \;&=\; \begin{cases} \mathbb{Z}\oplus\mathbb{Z} \\ 0 \\ \mathbb{Z}_2 \\ \mathbb{Z}_2 \end{cases} \quad \text{if } n \;=\; \begin{cases} 0 \\ 1 \\ 2 \\ 3 \end{cases} \end{aligned}$$

are given by

$$A \;:\; H_0(B\mathbb{Z}_2;\mathbb{L}_\bullet(\mathbb{Z})) \;=\; H_0(B\mathbb{Z}_2;L_0(\mathbb{Z})) \;=\; \mathbb{Z} \xrightarrow{1\oplus 1} L_0(\mathbb{Z}[\mathbb{Z}_2]) \;=\; \mathbb{Z}\oplus\mathbb{Z}\ ,$$

$$A \;:\; H_2(B\mathbb{Z}_2;\mathbb{L}_\bullet(\mathbb{Z})) \;=\; H_2(B\mathbb{Z}_2;L_0(\mathbb{Z}))\oplus H_0(B\mathbb{Z}_2;L_2(\mathbb{Z})) \;=\; \mathbb{Z}\oplus\mathbb{Z}_2 \xrightarrow{0\oplus 1} L_2(\mathbb{Z}[\mathbb{Z}_2]) \;=\; \mathbb{Z}_2\ ,$$

$$A \;:\; H_3(B\mathbb{Z}_2;\mathbb{L}_\bullet(\mathbb{Z})) \;=\; H_3(B\mathbb{Z}_2;L_0(\mathbb{Z}))\oplus H_1(B\mathbb{Z}_2;L_2(\mathbb{Z})) \;=\; \mathbb{Z}_2 \xrightarrow{0\oplus 1} L_3(\mathbb{Z}[\mathbb{Z}_2]) \;=\; \mathbb{Z}_2$$

(Hambleton, Milgram, Taylor and Williams [69]).”

p. 107 l. –1 $L^0(\mathbb{Z}[\mathbb{Z}_2])$

p. 112 l. 2 $C(K) = \Delta(X')$

p. 114 l. 2 i-connected

p. 117 l. 3 sets

p. 123 l. 4, p. 123 l. -3, p. 126 l. –5, p. 127 l. 6 $m + 1 = |J^{(0)}|$

p. 136 l. 16 Definition 13.2 "$(m + n)$-dimensional"

p. 140 ll. 8,9 The Δ-sets $\mathbb{L}_n(\Lambda^*(K))$, $\mathbb{L}_n(\Lambda)^{K_+}$ are not isomorphic, but they both have the realization $|\mathbb{L}_n(\Lambda)|^{|K_+|}$, so they are homotopy equivalent. See *Multiplicative properties of Quinn spectra* by Gerd Laures and Jim McClure, Forum Math. 26 (2014), no. 4, 1117–1185 (http://arxiv.org/abs/0907.2367) for a proof.

p. 149 l. –3 $\mathbb{H}_{\cdot}(K;\mathbb{L}^{\cdot}(R))$

p. 168 l. 10 $\mathbb{S}_n\langle 0\rangle(R,K) \;=\; \mathbb{S}_n(R,K) \;=\; \mathbb{S}_{n+4}(R,K)$ $(n \geq \max(\dim(K),2))$

p. 169 l. 3 $H_{n-1}(K;\mathbb{L}.)$

p. 175 l. 13 Add: *Let $\Omega^N(X,\nu)$ be the Kan Δ-set in which an n-simplex is an $(n-k)$-dimensional normal space n-ad*

$$(Y;\partial_1 Y,\ldots\partial_n Y;\nu_Y : Y \to BG(k),\rho : \Delta^n \to T(\nu_Y))$$

such that $\rho(\partial_i\Delta^n) \subset T(\nu_{\partial_i Y})$, with a normal map $(f,b) : (Y,\nu_Y) \to (X,\nu)$. The map of Kan Δ-sets

$$\Omega^N(X,\nu) \to T(\nu)\ ;\ (Y;\partial_1 Y,\ldots,\partial_n Y;\nu_Y,\rho) \to T(b)\rho$$

induces the normal space Pontrjagin-Thom transversality isomorphisms $\Omega^N_n(X,\nu) \to \pi_n(T(\nu))$ with inverses

$$\pi_n(T(\nu)) \to \Omega^N_n(X,\nu)\ ;\ \rho_X \to ((X,\nu,\rho_X),1)$$

and is thus a homotopy equivalence.

p. 185 l. 8 add 16.11 (x) Edwards 'The topology of manifolds and cell-like maps' (Proc. 1978 ICM Helsinki, 111–127 (1980)) showed that for $n \geq 5$ an n-dimensional combinatorial homology manifold K is a topological manifold if and only if the link of each simplex $\sigma \in K$ is simply-connected.

p. 193 l. –5 reducible

p. 197 l. 7 if and only if $[f,b]_{\mathbb{L}} = 0 \in H_n(M;\mathbb{L}.)$

p. 199 l. –5 according to which

p. 200 l. 12 Corollary 18.6 (i) is only true after the 4-periodic stabilization of n: see Theorem B of I.Hambleton, *Surgery obstructions on closed manifolds and the inertia subgroup*, arXiv:0905.0104

p. 202 l. –2 closed manifold

p. 210 l. 4 Q^8 is obtained by coning off the boundary of a differentiable 8-dimensional manifold with boundary one of the 27 7-dimensional exotic spheres classified by Kervaire and Milnor [83], but it is not one of the original 7 examples of Milnor [108].

p. 216 l. –9 The cohomology group $H^{-m}(B;\mathbb{L}^\cdot)$ should be replaced by the cobordism group $L^m(B;\mathbb{Z})$ of homogeneous m-dimensional Poincaré cocycles over B defined in the appendix to Lück and Ranicki [100], with a forgetful map $L^m(B,\mathbb{Z}) \to H^{-m}(B;\mathbb{L}^\cdot)$ and an assembly map $A : L^m(B,\mathbb{Z}) \to L^m(\pi_1(B),\mathbb{Z})$. For any PL fibration $F \longrightarrow E \xrightarrow{p} B$ with base B a compact n-dimensional homology manifold and fibre F a compact m-dimensional homology manifold the Δ-map $B \longrightarrow \mathbb{L}^{-m}(\mathbb{Z})$ sending each simplex $\tau \in B$ to the symmetric Poincaré fibre $\sigma^*(p^{-1}\tau)$ over $\mathbb{Z}$ represents an element $(F,p)_{\mathbb{L}} \in L^m(B;\mathbb{Z})$. The composite

$$p_!p^! \;:\; L_n(\mathbb{Z}[\pi_1(B)]) \longrightarrow L_{m+n}(\mathbb{Z}[\pi_1(E)]) \longrightarrow L_{m+n}(\mathbb{Z}[\pi_1(B)])$$

is shown in [100] to depend on the assembly

$$A((F,p)_{\mathbb{L}}) \;=\; \sigma^*(F,p) \in L^m(\pi_1(B),\mathbb{Z}) \;.$$

The total space E is a compact $(m+n)$-dimensional manifold E such that the canonical $\mathbb{L}^\cdot$-homology fundamental class $[E]_{\mathbb{L}} \in H_{m+n}(E;\mathbb{L}^\cdot)$ has image

$$p_![E]_{\mathbb{L}} \;=\; [F,p]_{\mathbb{L}} \cap [B]_{\mathbb{L}} \in H_{m+n}(B;\mathbb{L}^\cdot)$$

with $[F,p]_{\mathbb{L}} \in H^{-m}(B;\mathbb{L}^\cdot)$ the image of $(F,p)_{\mathbb{L}}$.

p. 220 l. –1 $I \;=\; \mathrm{im}(K_0(\mathbb{Z})) \;=\; d\mathbb{Z} \subset K_0(M_d(\mathbb{Z}[\bar{\pi}])) \;=\; K_0(\mathbb{Z}[\bar{\pi}]) \;=\; \mathbb{Z} \oplus \widetilde{K}_0(\mathbb{Z}[\bar{\pi}])$

p. 234 l. –9 $\dim_K(A^+) \;=\; \dim_K(A^-) \;=\; d^2$

p. 241 l. 11 $L_*(i_!^- : A \to A[\sqrt{a}]^-) \;\cong\; L_{*+1}(i_!^+ : A \to A[\sqrt{a}]^+)$

p. 259 l. 6 *The image of the splitting obstruction*

p. 271 l. 3 Define an isomorphism $H_n(M;\mathbb{L}^\cdot) \otimes \mathbb{Q} \;\cong\; H_{n-4*}(M;\mathbb{Q})$ by sending the image $i_*([N]_{\mathbb{L}})$ of the fundamental $\mathbb{L}^\cdot$ fundamental class $[N]_{\mathbb{L}} \in H_n(N;\mathbb{L}^\cdot)$ of an n-dimensional submanifold $i : N \subset M \times \mathbb{R}^k$ (k large) with trivial normal bundle to $i_*(\mathcal{L}(N)^*)$, with $\mathcal{L}(N)^* \in H_{n-4*}(N;\mathbb{Q})$ the Poincaré dual of the Hirzebruch $\mathcal{L}$-genus $\mathcal{L}(N) \in H^{4*}(N;\mathbb{Q})$.

p. 271 l. 5 $H_0(M;\mathbb{Q}) = \mathbb{Q}$

p. 273 l. 18 π is finitely presented.

p. 276 l. –3 close brackets ($\times$ 2)

p. 283 l. –14 $B^{global}(C,\phi) - B^{local}(C,\phi) \;=\; (B\sigma^*(Y) - 1)/8$

p. 297 l. –10 25.13 The construction of exotic homology manifolds by Bryant, Ferry, Mio and Weinberger is announced in 'The topology of homology manifolds' (Bull. A.M.S. 28, 324–328 (1993)).

p. 325 l. –8 The definition of $\mathbb{A}[\pi]$ for an additive category $\mathbb{A}$ and a group π is garbled. Let $\mathbb{A}[\pi]$ be the additive category with one object $M[\pi]$ for each object M in $\mathbb{A}$, and

$$\mathrm{Hom}_{\mathbb{A}[\pi]}(M[\pi], N[\pi]) \;=\; \mathrm{Hom}_{\mathbb{A}}(M, N)[\pi]$$

the additive group of formal linear combinations $\sum\limits_{g\in\pi} f_g g$ with $f_g \in \mathrm{Hom}_{\mathbb{A}}(M, N)$ such that $\{g \in \pi \,|\, f_g \neq 0\}$ is finite. An involution on $\mathbb{A}$ is extended to an involution on $\mathbb{A}\,[\pi]$ by

$$\begin{aligned} &* \,:\; \mathbb{A}\,[\pi] \;\to\; \mathbb{A}\,[\pi]\;; \\ &M[\pi] \;\to\; (M[\pi])^* \;=\; M^*[\pi]\;,\; f \;=\; \textstyle\sum_{g\in\pi} f_g g \;\to\; f^* \;=\; \textstyle\sum_{g\in\pi} (f_g)^* g^{-1}\;. \end{aligned}$$

p. 326 l. 12 The surgery obstruction $\sigma_*(f, b) \in L_n(\mathbb{C}_X(\mathbb{Z})[\pi]))$ of an n-dimensional X-bounded normal map (f, b) is the cobordism class of an n-dimensional quadratic Poincaré complex in $\mathbb{C}_X(\mathbb{Z}[\pi])$ which may be obtained either by considering the middle-dimensional form/formation remaining after surgery below the middle dimension as in Ferry and Pedersen [50], or else using the algebraic normal maps of 2.16. A normal map $(f, b)\colon J \to K$ of X-bounded geometric Poincaré complexes induces an algebraic normal map $\sigma^*(J) \to \sigma^*(K)$ of symmetric Poincaré complexes in $\mathbb{C}_X(\mathbb{Z}[\pi])$, with a quadratic Poincaré kernel $\sigma_*(f, b)$ in $\mathbb{C}_X(\mathbb{Z}[\pi])$.

p. 345 l. –15 [51] S. Ferry, I. Hambleton and E. K. Pedersen A survey of bounded surgery theory and applications. *Algebraic Topology and Its Applications*, Springer, 57–80 (1993)

p. 345 l. −13 [52 S. Ferry and E. K. Pedersen Epsilon surgery. *Novikov conjectures, Index Theorems and Rigidity.* Vol. 2, L. M. S. Lecture Notes **227**, Cambridge, 167–226 (1995)

p. 346 l. 20 [64] I. Hambleton and I. Madsen On the computation of the projective surgery obstruction groups. *K-theory* **7**, 537–574 (1993)

p. 347 l. 8 [78] B. Hughes and A. Ranicki *Ends of complexes.* Cambridge Tracts in Mathematics 123, Cambridge (1996)

p. 350 l. 20 [134] F. Quinn Assembly maps in bordism-type theories. *Novikov conjectures, Index Theorems and Rigidity.* Vol. 1, L. M. S. Lecture Notes **226**, Cambridge, 201–271 (1995)

p. 351 l. 9 [148 A. Ranicki and M. Yamasaki Controlled K-theory. *Topology and Its Applications* 61, 1–59 (1995)

p. 352 l. –20 [174] C. T. C. Wall Poincaré complexes I. Ann. of Maths. 86, 213–245 (1967)

p. 352 l. –2 [176] C. T. C. Wall *Surgery on compact manifolds.* Academic Press (1970)

p. 352 l. –8 [183] S. Weinberger *The topological classification of stratified spaces.* Chicago (1994)