Errata for

Global homotopy theory

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This document lists typos and mistakes that I became aware of after publication of the book *Global homotopy theory* in September 2018. As of today, I know of no serious mathematical issue, but there are a certain number of potentially misleading typos. I would like to thank Benjamin Böhme, Jack Davies and Alexander Müller for discovering some of them.

p.23, l.14: the $(K \times G)$-cofibrations should be defined by the *left* lifting property (not the *right* lifting property) with respect to all morphisms of $(K \times G)$-spaces f such that f^Γ is a weak equivalence and Serre fibration for every closed subgroup Γ of $K \times G$.

p.64, l.-14: '(...) the $\mathcal{F}$-global model structure lifts to categor<u>ies</u> of modules and algebras (...)' (plural)

p.65, l.1: the $\mathcal{F}(m)$-cofibrations should be defined by the *left* lifting property (not the *right* lifting property) with respect to all morphisms q of $O(m)$-spaces such that the map q^H is a weak equivalence and Serre fibration for all $H \in \mathcal{F}(m)$.

p.162, l.13: the arguments to $f^\star$ and $(\mathbf{Gr}(\varphi) \circ f)^\star$ are missing. The correct sentence should be: 'So the two G-vector bundles $f^\star(\gamma_V)$ and $(\mathbf{Gr}(\varphi) \circ f)^\star(\gamma_W)$ over A are isomorphic.'

p.166, l.-1: as <u>we</u> shall now explain

p.240, l.7; p.284, l.6 and l.8; p.471, l.5; and p.548, l.-8: the term 'antipodal map' for the involution of S^V that gives rise to $\varepsilon_V : \pi_k^G(X \wedge S^V) \longrightarrow \pi_k^G(X \wedge S^V)$ is misleading: the involution $S^{-\mathrm{Id}_V} : S^V \longrightarrow S^V$ fixes the points 0 and ∞ and sends every other vector to its negative. So the restriction to the unit sphere is what is usually called the antipodal map. There is nothing wrong with the mathematics, but the adjective 'antipodal' is poorly chosen here.

p.251, proof of Prop. 3.1.36: As stated, the right triangle in the upper diagram on page 251 does *not* commute up to based G-homotopy. Instead, the right diagonal map $f \wedge S^1 : X \wedge S^1 \longrightarrow Y \wedge S^1$ must be replaced by $f \wedge \tau : X \wedge S^1 \longrightarrow Y \wedge S^1$, where $\tau : S^1 \longrightarrow S^1$ is the sign involution $\tau(x) = -x$. In this corrected form, the commutativity of the right triangle is an instance of Proposition 3.1.35 (i). This mistake also influences the next step in the proof of exactness. Because the degree of the sign involution τ is -1, the right square that compares the sequence for

$i : Y \longrightarrow Cf$ with the sequence for $f : X \longrightarrow Y$ only commutes up *up to sign*:

$$\begin{aligned} \partial &= (- \wedge S^{-1}) \circ \pi_k^G(p_i) \\ &= (- \wedge S^{-1}) \circ \pi_k^G(f \wedge \tau) \circ \pi_k^G(* \cup p) \\ &= -(- \wedge S^{-1}) \circ \pi_k^G(f \wedge S^1) \circ \pi_k^G(* \cup p) \\ &= -\pi_{k-1}^G(f) \circ (- \wedge S^{-1}) \circ \pi_k^G(* \cup p) \ . \end{aligned}$$

(There is also a typo, in that $\pi_k^G(f)$ should be $\pi_{k-1}^G(f)$.) Fortunately, changing a homomorphism of abelian groups into its negative does not change kernel nor cokernel. So the extra sign does not influence the question of exactness.

p.367, l.-9: this should read '(...) and K-representation $\bar{U}$ (...)' (as opposed to 'G-representation').

p.367, l.-4/5: the two instances of equivariant homotopy groups should be indexed by the Lie group K (as opposed to G), so they should read $\pi_k^K(\lambda_{G,V,W})$ and $\pi_{-k}^K(\lambda_{G,V,W})$, respectively.

p.414, l.-15: in the proof of Theorem 4.4.4, it should read '(...) if F preserves sums, then for every object X of $\mathcal{S}$, (...)' (as opposed to: 'for every object X of $\mathcal{T}$')

p.454, l.8: in the displayline, the supercript 'G' is missing from $\mathbb{Q} \otimes \pi_k^G(f)$

p.562, l.-13 should read '(...) $\tau_{G,V}$ lies in the homogeneous summand $\mathbf{mOP}^{[-m]}$.' (as opposed to $\mathbf{MOP}^{[-m]}$)