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ERRATUM

Erratum to: On the gluing formula for the analytic torsion

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In this note, we want to correct a mistake in the proof of [1, Theorem 2.2] which does not affect the statement of the theorem, though. In [1, (2.7)], we incorrectly state an isomorphism of complexes, thus we need to modify the corresponding argument, by first replacing the last six lines on p. 1098, beginning with "we also have $\cdots$", with the following text.

"We also have a $\mathbb{Z}_2$-equivariant short exact sequence of complexes

$$0 \to C^\bullet(W^u/W^u_{Y_1}, F) \otimes \mathbb{C}^- \xrightarrow{\gamma} C^\bullet(\widetilde{W}^u, \widetilde{F}) \xrightarrow{\gamma} C^\bullet(W^u, F) \otimes \mathbb{C}^+ \to 0, \tag{2.7}$$

given by

$$\gamma(\mathfrak{b}^* \otimes 1_{\mathbb{C}^-}) = \frac{\sqrt{2}}{2}\Big((j_1^{-1}|_{X_1})^*\mathfrak{b}^* - (j_2^{-1}|_{X_2})^*\mathfrak{b}^*\Big), \ \gamma(\mathfrak{a}^*) = \frac{\sqrt{2}}{2}\Big(j_1^*\mathfrak{a}^*|_{X_1} + j_2^*\mathfrak{a}^*|_{X_2}\Big)\otimes 1_{\mathbb{C}^+}, \tag{2.8}$$

with $X_i = j_i(X)$, which induces a $\mathbb{Z}_2$-equivariant short exact sequence

$$0 \to H^\bullet(X, Y_1, F) \otimes \mathbb{C}^- \xrightarrow{\gamma} H^\bullet(\widetilde{X}, \widetilde{F}) \xrightarrow{\gamma} H^\bullet(X, F) \otimes \mathbb{C}^+ \to 0." \tag{2.9}$$

Then replace [1, (2.11)] by

$$\gamma(\mathfrak{a}^*) = \sqrt{2}\mathfrak{a}^* \otimes 1_{\mathbb{C}^+}, \tag{2.11}$$

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and [1, (2.15)] by

$$\log\left(\|\mu\|^{M,\nabla f}_{\det(H^{\bullet}(\widetilde{X},\widetilde{F}),\mathbb{Z}_2)}\right)(g) = -\frac{1}{2}\log(2)\sum_{x\in B\cap Y_1}(-1)^{\mathrm{ind}(x)}\mathrm{rk}(F) + \log\|\gamma_1^{-1}\mu_1\|^{M,\nabla f}_{\det H^{\bullet}(X,F)} + \chi(g)\log\|\gamma_2^{-1}\mu_2\|^{M,\nabla f}_{\det H^{\bullet}(X,Y_1,F)}. \tag{2.15}$$

Finally, replace the bottom of p. 1100 from [1, (2.20)] on by:
"for $\sigma_1 \in H^{\bullet}(\widetilde{X},\widetilde{F})^{+}$, $\sigma_2 \in H^{\bullet}(X, Y_1, F)$,

$$P_\infty \circ \widetilde{\phi}_1 \circ P_\infty^{-1}(\sigma_1)|_{C_{\bullet}(W^u,F^*)} = \frac{\sqrt{2}}{2}(\sigma_1 + \phi^*\sigma_1)|_{C_{\bullet}(W^u,F^*)} = \gamma\sigma|_{C_{\bullet}(W^u,F^*)}, \tag{2.20}$$
$$(P_\infty \circ \widetilde{\phi}_2 \circ P_\infty^{-1} \circ \gamma)(\sigma_2 \otimes 1_{\mathbb{C}^-})|_{C_{\bullet}(W^u/W^u_{Y_1},\widetilde{F}^*)} = \sigma_2|_{C_{\bullet}(W^u/W^u_{Y_1},\widetilde{F}^*)}.$$

Set

$$\tau_\pm = \gamma_\pm \circ P_\infty \circ \widetilde{\phi} \circ P_\infty^{-1} : H^{\bullet}(\widetilde{X},\widetilde{F})^{\pm} \to H^{\bullet}(\widetilde{X},\widetilde{F})^{\pm}, \tag{2.21}$$

with $\gamma_+ = \gamma_1$, $\gamma_- = \gamma_2$. By (2.20), we get

$$\tau_\pm = \mathrm{Id}." \tag{2.22}$$

Reference

1. Brüning, J., Ma, X.: On the gluing formula for the analytic torsion. Math. Z. **273**(3–4), 1085–1117 (2013)