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ERRATUM TO "FLOER MINI-MAX THEORY, THE CERF DIAGRAM, AND THE SPECTRAL INVARIANTS, J. KOREAN MATH. SOC. 46 (2009), NO. 2, 363–447"

Yong-Geun Oh

The following theorem is proved for the rational case in [1] and its 'proof' for the irrational case was given in [2, Section 10].

Theorem 0.1 (Homotopy Invariance; [2, Theorem 10.3])**.** *For any pair* (H, K) *satisfying* $H \sim K$*, we have*

$$\rho(H; a) = \rho(K; a).$$

The proof in [2] for the irrational case is based on the following statement which we employed in the middle of the proof of this theorem:

"We note that the Hamiltonian

$$K \# H_i \# \overline{K}$$

generates the flow $\phi_K^t \circ \phi_{H_i}^t \circ (\phi_K^t)^{-1}$, which is conjugate to the flow $\phi_{H_i}^t$ and is nondegenerate. Therefore we have

$$\rho(H_i; a) = \rho(K \# H_i \# \overline{K}; a)$$

by the symplectic invariance of ρ".

Unfortunately, this statement is an incorrect application of symplectic invariance of the spectral invariant ρ: The axiom 'symplectic invariance' in Theorem 10.1 [2] applies to the type

$$\psi \circ \phi_{H_i}^t \circ \psi^{-1}$$

of conjugation by a *fixed* symplectic diffeomorphism ψ *not* of the conjugation $t \mapsto \phi_K^t \circ \phi_{H_i}^t \circ (\phi_K^t)^{-1}$ by a t-dependent family such as ϕ_K^t.

To correct this error, we need to make a more specific choice of the approximation sequences H_i, K_i of special type as used in the following lemma. The proof of this lemma is a standard application of generic perturbation arguments such as the ones used in [2, Section 3].

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Lemma 0.2. *Let H, K be two, not necessarily nondegenerate, Hamiltonians. There exists a sequence of smooth functions f_i converging to* 0 *in C^2 topology such that both $H\#f_i$ and $K\#f_i$ are nondegenerate for all i.*

We note that the Hamiltonians $H\#f_i$ and $K\#f_i$ generate the isotopies $\phi_H^t\phi_{f_i}^t$ and $\phi_K^t\phi_{f_i}^t$ respectively. Therefore if $H \sim K$, we have

$$\phi^1_{H\#f_i} = \phi^1_H\phi^1_{f_i} = \phi^1_K\phi^1_{f_i} = \phi^1_{K\#f_i},$$

and the path $t \mapsto \phi_H^t\phi_{f_i}^t$ is homotopic to $t \mapsto \phi_K^t\phi_{f_i}^t$ relative to the boundary on $[0,1]$, i.e., $H\#f_i \sim K\#f_i$.

Therefore by taking the limits, we get

$$\rho(H;a) = \lim_{i\to\infty} \rho(H\#f_i;a) = \lim_i \rho(K\#f_i;a) = \rho(K;a)$$

where the first and the last equalities come from the C^0-continuity and the second follows from nondegenerate spectrality. This then finishes the proof of the above theorem of homotopy invariance.

References

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Department of Mathematics
University of Wisconsin
Madison, WI 53706, USA
and
Department of Mathematics
POSTECH
Pohang 790-784, Korea
E-mail address: oh@math.wisc.edu