Errata of "On a definition of multi-Koszul algebras" by E. Herscovich and A. Rey

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Some time after the publication of our article [3] we noticed that Lemma 3.16 in the mentioned article is incorrect. A simple counterexample is given by the sequence $0 \to A \to k$ of graded left A-modules. The lemma however holds –but with another proof– if one further imposes that the modules L, M and N are free, and I^n/I^{n+1} is a free A/I-module for every $n \in \mathbb{N}$ (see [1], Lemme 1.6). The last assumption is verified if $I = A_{>0}$, but unfortunately not in general. As a consequence, the new correct version of Theorem 3.17 should only state that condition (ii) implies (i), and the converse holds if A^s is s-Koszul, for all $s \in S$. An algebra $A = TV/\langle R \rangle$ satisfying the condition (ii) in Theorem 3.17 will be called *restricted multi-Koszul*. In the remaining results in Section 3 and all of the results in Subsections 5.4 and 5.5 of [3] concerning multi-Koszul algebras, one should further impose that they are restricted in the previous sense, so the given proofs still hold.

Despite the previous drawback, the results of [3] that are (in our opinion) the most interesting still hold, and they were proved using completely different tools in [2]. More precisely, in the mentioned article we proved that Corollary 3.23 in [3] holds for any multi-Koszul algebra (see [2], Thm. 4.1), and that the description of the A_∞-algebra structure on the Yoneda algebra of a multi-Koszul algebra stated in Remark 3.25 of [3] also holds (see [2], Thm. 4.8). Additionally, we would like to point out that (the proof of) Theorem 4.1 in [3] is still true, using the new version of Lemma 3.16 stated previously.

References

[1] Roland Berger, *La catégorie des modules gradués sur une algèbre graduée* (2008). Nouvelle version du chapitre 5 d'un cours de Master 2 à Lyon 1.

[2] Estanislao Herscovich, *On the multi-Koszul property for connected algebras*, Doc. Math. **18** (2013), 1301–1347.

[3] Estanislao Herscovich and Andrea Rey, *On a definition of multi-Koszul algebras*, J. Algebra **376** (2013), 196–227.

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