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Corrections to : "The algebraic topology of smooth algebraic varieties"

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CORRECTION TO :

THE ALGEBRAIC TOPOLOGY OF SMOOTH ALGEBRAIC VARIETIES

by John W. MORGAN

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P. Deligne and R. Hain independently pointed out to me discrepancies between work that each of them has done concerning mixed Hodge structures on the fundamental group of an algebraic variety ([1] and [2]) and result 9.2 of [3]. Deligne recently indicated to me my error.

An invariant of a minimal differential graded algebra is said (in the language of [3]) to be *rigid* if homotopic maps induce the identical map on the invariant. The proof of Theorem 9.2 in [3] is based on the false assertion that the space of indecomposables is a rigid invariant. What is true is that a minimal differential algebra has naturally associated to it an increasing filtration (p. 168 of [3]). This induces a filtration on the indecomposables. The associated graded of this filtration is a rigid invariant. In particular, in the simply connected case the filtration is by degree and naturally split. Thus, in this case, the indecomposables themselves are rigid invariants.

Theorem 9.1 concerns the simply connected case and needs no change. What is actually proved instead of Theorem 9.2 is the following:

Theorem **9.2** *(revised version). — Let* X *be a smooth algebraic variety and* $x_0 \in X$ *a point. The tower of nilpotent Lie algebras associated with the rational nilpotent completion of* $\pi_1(X, x_0)$ *admits the structure of a tower of Lie algebras in the category of mixed Hodge structures. The weight filtration is a filtration by sub-algebras. It is unique and functorial with respect to algebraic maps. The Hodge filtration is well-defined up to inner automorphisms. Its conjugacy class is functorial with respect to algebraic maps.*

All other results in Sections 9 and 10 make no mention of well-definedness or functorality; they are correct as stated.

Deligne and Hain ([1] and [2]) each have defined functorial mixed Hodge structures on $\pi_1(X, x_0)$, X an algebraic variety. These vary as the point x_0 varies.

REFERENCES

[1] P. Deligne, Private Communication.

[2] R. Hain, Mixed Hodge Structures on Homotopy Groups, *Bull. A.M.S.*, **14** (1986), 111-114.

[3] J. Morgan, The Algebraic Topology of Smooth Algebraic Varieties, *Publ. Math. I.H.E.S.*, **48** (1978), 137-204.