

# Categories in Algebra, Geometry and Mathematical Physics

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## “Triples vs. Theories” as YAYLE (Yet Another Yoneda Lemma Exercise)

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### Abstract

Anyone reading the horribly computational proof, to be found in the last section of the author's first Zurich Triples Book article (cf. [2], s. 11), of the equivalence (originally announced in [1]) between the notions of Eilenberg-Moore algebras for a monad and Lawvere-style algebras over the Kleisli category of that monad, must have wondered whether all the evaluations at identity maps (e.g. (9.2.1), (9.6)) weren't really a tip-off that, somehow or other, this was another instance of the Yoneda Lemma (YL) at work.

After some nearly forty years of brooding over it, we have finally come to understand just how those ugly computations really do amount to nothing more than the standard proof of YL – rendered particularly opaque by relying explicitly on all the (essentially extraneous) notational complications inherent in the special case appropriate to the [2] setting – along with detailed tracking of some relevant side conditions.

In penance both for the initial blindness – pretty unforgivable – and for the subsequent – and at least equally unforgivable – close-to-forty-year interval before finally seeing the light, this talk will expose just how easily that [2] equivalence does follow from YL, and how easily those side conditions then track.

[1] *Linton, F.E.J.*, Triples vs. Theories (preliminary report), Notices Amer. Math. Soc. 13 (1966), p. 227.

[2] *Linton, F.E.J.*, An Outline of Functorial Semantics, in the Zurich Triples Book (SLNM 80 (1969)), pp. 7-52 (esp. sections 9 and 11).