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70506. *What do homotopy algebras form?*

In this talk, I will describe joint work with V. Dolgushev in which we use ideas from deformation theory to construct an enriched category whose objects are homotopy algebras of a fixed type, e.g.,  $L_\infty$ ,  $A_\infty$ , or  $\text{Ger}_\infty$  algebras. The enrichment is over a certain symmetric monoidal category of  $L_\infty$ -algebras. Roughly, this is a “non-abelian” analogue of the fact that chain complexes are enriched over themselves. From this  $L_\infty$ -enriched category, we obtain a simplicial category by using a non-abelian analogue of the Dold-Kan functor. We show that the mapping spaces in this simplicial category are, in fact, Kan complexes, and that this construction produces an explicit model for the  $\infty$ -category of homotopy algebras. (Received August 07, 2015)