Abstract. The deformation complex of an algebra over a colored PROP $P$ is defined in terms of a minimal (or, more generally, cofibrant) model of $P$. It is shown that it carries the structure of an $L_{\infty}$-algebra which induces a graded Lie bracket on cohomology.

As an example, the $L_{\infty}$-algebra structure on the deformation complex of an associative algebra morphism $g$ is constructed. Another example is the deformation complex of a Lie algebra morphism. The last example is the diagram describing two mutually inverse morphisms of vector spaces. Its $L_{\infty}$-deformation complex has nontrivial $l_0$-term.

Explicit formulas for the $L_{\infty}$-operations in the above examples are given. A typical deformation complex of a diagram of algebras is a fully-fledged $L_{\infty}$-algebra with nontrivial higher operations.