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**Liping Li\*** ([lixxx480@math.umn.edu](mailto:lixxx480@math.umn.edu)), 504 Vincent Hall 206 Church St. SE., Minneapolis, MN 55455. *A generalized Koszul theory and its application.*

Let  $A$  be a non-negatively graded, locally finite algebra. We develop a generalized Koszul theory by assuming that the degree 0 part  $A_0$  is self-injective instead of semisimple. It turns out that many results in the classical theory generalize to the broader situation. In particular, we obtain the Koszul duality.

This generalized theory can be applied to many algebraic structures which have natural gradings, but the degree 0 parts are not semisimple. These structure includes finite EI categories and directed categories, which are locally finite  $k$ -linear categories  $\mathcal{C}$  such that there is a partial order  $\leq$  on  $\text{Ob}\mathcal{C}$  satisfying that  $\text{Hom}_{\mathcal{C}}(x, y) \neq 0$  implies  $x \leq y$ . In particular, we get a nice correspondence between the generalized theory and the classical theory in the context of directed categories.

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