

## A Homotopy of Quiver Morphisms with Applications to Representations

Edgar E. Enochs and Ivo Herzog

*Abstract.* It is shown that a morphism of quivers having a certain path lifting property has a decomposition that mimics the decomposition of maps of topological spaces into homotopy equivalences composed with fibrations. Such a decomposition enables one to describe the right adjoint of the restriction of the representation functor along a morphism of quivers having this path lifting property. These right adjoint functors are used to construct injective representations of quivers. As an application, the injective representations of the cyclic quivers are classified when the base ring is left noetherian. In particular, the indecomposable injective representations are described in terms of the injective indecomposable  $R$ -modules and the injective indecomposable  $R[x, x^{-1}]$ -modules.

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