Path algebras as contravariant functors

Abstract: To any directed graph (aka quiver) one can associate various algebras, e.g. path algebras and Leavitt path algebras. Path algebras can be used to classify finite-dimensional algebras over algebraically closed fields while Leavitt path algebras have strong connections with the theory of C^*-algebras and noncommutative geometry. Recently, concrete problems in noncommutative geometry motivated the study of contravariant functors from certain categories of graphs to the category of associative algebras which simply assign a path algebra or Leavitt path algebra to a given graph. These functors have one remarkable property: they transform pushouts of graphs into pullbacks of algebras.