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The contravariant functoriality of graph algebras

We introduce a subcategory of directed graphs for which the construction of Leavitt path algebras induces a contravariant functor into the category of algebras. Then we prove a theorem stating under which conditions this functor turns pushouts of directed graphs into pullbacks of algebras. Finally, using the result of A. Chirvasitu concerning the passage from pullbacks of Leavitt path algebras to the pullbacks of their completions, we conclude the same-type theorem for graph C*-algebras. To broaden the scope of pullback theorems, we also consider a covariant induction of morphisms between graph C*-algebras given by specifically tailored path morphisms of graphs that substantially enlarge the standard category of graphs. (Based on joint work with P. M. Hajac.)