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Free semigroupoid algebras

To each directed graph G one can associate a Fock space Hilbert space, whose basis is indexed by all the finite paths of the graph, together with natural shift operators (partial creation operators). I shall describe some joint work with David Kribs which develops the theory of the weakly closed nonselfadjoint algebras L_G generated these operators. The algebras may be finite dimensional, they may have function matrix representations, or, in contrast, they may possess subalgebras which are freely noncommutative. In particular these algebras generalise the motivating examples of free semigroup algebras currently under study (and which correspond to G with a single vertex). Moreover we create a context in which the Toeplitz algebra is no longer a lonely special case.

Our main theorem shows that the graph is a complete unitary invariant for the algebra. This classification theorem makes use of an analysis of unitarily implemented automorphisms. I shall talk about this and other aspects such as characterising when L_G contains L_2 and the perspective of amalgamated free products.