

Title: Separability idempotents and quantum groupoids

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Abstract: If G is a finite group, one can associate a Hopf algebra by taking the algebra $K(G)$ of all complex functions on G and the coproduct Δ defined by $\Delta(f)(p, q) = f(pq)$ where $p, q \in G$. In this case, Δ is a unital homomorphism from $K(G)$ to $K(G) \otimes K(G)$ and it is coassociative $(\Delta \otimes \iota)\Delta = (\iota \otimes \Delta)\Delta$ (where ι is the identity map). This is the motivating example for the theory of locally compact quantum groups.

If G is a finite *groupoid*, one can still define this coproduct Δ on the algebra $K(G)$ by letting $\Delta(f)(p, q) = f(pq)$ if pq is defined and $\Delta(f)(p, q) = 0$ if not. Then Δ is still a homomorphism from $K(G)$ to $K(G) \otimes K(G)$, it is still coassociative, but it is no longer unital. Now the pair $(K(G), \Delta)$ is a weak Hopf algebra. This is the basic ingredient for the theory of *quantum groupoids*.

The idempotent E , defined as $\Delta(1)$, plays a central role in the theory of these weak Hopf algebras. Indeed, whereas in the case of a Hopf algebra, it is trivially 1, in the case of a weak Hopf algebra, the properties of this idempotent make the essential difference of a weak Hopf algebra over a Hopf algebra. And hence also between the theory of quantum groups and quantum groupoids.

In this talk I will discuss the concept of a separability idempotent as it appears in the theory of quantum groupoids. The model is the idempotent E , defined in the case of a finite groupoid as $\Delta(1)$. But of course, in general, it is more involved.