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A Hopf category of Frobenius algebras

A well-known result of Sweedler tells that the category of algebras can be enriched over coalgebras, by considering the universal measuring coalgebra between two algebras as the Hom-object between them. Another way of stating this result, is that the category of algebras can be given a semi-Hopf category structure. By a similar construction, one can build a universal measuring coalgebra $C(A, B)$ between any two Frobenius algebras A and B (being not just compatible with the algebra structure but also with their coalgebra (or Frobenius) structure). A remarkable observation is that in this way we do not just obtain a semi-Hopf category structure but even a Hopf category, meaning that there exists an anti-coalgebra morphism from $C(A, B)$ to $C(B, A)$ satisfying a natural antipode property. In particular, the universal acting bialgebra on a Frobenius algebra is always Hopf, which generalizes the known result that any (endo)morphism of Frobenius algebras is invertible.

This is based on joint works with Ana Agore and Alexey Gordienko, and with Paul Grosskopf.

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