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Miodrag Cristian Iovanov* (yovanov@gmail.com). *The theory of integrals: from compact groups to Hopf algebras and coalgebras*. Preliminary report.

The integrals from (locally) compact groups are generalized to Hopf algebras, and very nice generalizations of the existence and uniqueness of the Haar measure are now classical in the theory of Hopf algebras. In fact, the existence of integrals characterizes the class of co-Frobenius Hopf algebras, and the uniqueness of integrals follows for Hopf algebras as well, as for (locally) compact groups. It is well known that the two situations overlap if one considers the Hopf algebra of representative functions associated to a (locally) compact group G .

We generalize these results to the more general and abstract case of coalgebras. We use a pure co-algebraic notion of (generalized) integrals and show that the existence and uniqueness properties of (left, or right) integrals for coalgebras also provide a characterization of co-Frobenius coalgebras. We give an interesting interpretation of these integrals in compact groups as "vector integrals" and we obtain new significant characterizations of co-Frobenius coalgebras as well as proofs of the classical results from Hopf algebras as a consequence of our results. (Received March 10, 2008)