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**Sorin Dascalescu**, Str Academiei 14, Sect 1, 010014 Bucharest, Romania, **Miodrag C Iovanov\*** (yovanov@gmail.com), Str. Academiei 14, Sect 1, 010014 Bucharest, Romania, and **Constantin Nastasescu**, Str. Academiei 14, Sect 1, 010014 Bucharest, Romania. *Infinite path and incidence (co)algebras: Frobenius and finiteness properties and new classes of quantum groups.*

An object of central interest in representation theory is that of representation of a quiver. More generally, interesting algebras arise in various fields as quotients of quiver algebras by relations generated by paths. The quiver coalgebra is tightly connected to the quiver algebra, and sometimes they be recovered from each other. We look at two combinatorial objects: quivers and locally finite PO-sets. A question of general interest is when such (co)algebras can be endowed with a Hopf algebra structure, i.e. when their category of (co)representations has the extra structure of a tensor category. We look at a very important class of Hopf algebras, namely those with non-zero integral, which generalize algebras of functions on a compact group. They have a special representation theoretic property: their category of (co)representations is Frobenius. We analyze this property for path (co)algebras and more general for subcoalgebras of quiver coalgebras which have a basis of paths, and for incidence coalgebras of PO sets. We give a unitary approach for these two types of combinatorial objects, and give combinatorial characterizations for this condition. We classify these structures, as well as the Hopf algebras arising this way; this defines an interesting and wide class of algebras. (Received December 13, 2010)