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Deformations of incidence algebras and applications to representation theory.

Cohomology of incidence algebras of posets and singular cohomology of the simplicial realization of the poset have been noticed to be closely related by works of Gerstenhaber, Schack, Cibils, Igusa, Zacharia. Deformations of incidence algebras of more general ordered structures are parametrized by the second cohomology group of the associated simplicial space. We give intrinsic characterizations of these deformations in algebraic and representation theoretic terms. This approach has applications to algebras of finite representation type: first, given some such finiteness condition for an algebra A , using our results and coalgebra techniques one first proves that A is such a deformation; then prove the associated space is contractible and obtain that A is an incidence algebra. This recovers, in part, results of Bautista, Gabriel, Router, Salmeron from the 1985 Invent. Math. paper. This is partly joint with G. Koffi. (Received August 11, 2015)