

HARISH-CHANDRA CATEGORIES AND KOSTANT'S THEOREM

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A famous result of B.Kostant states that the universal enveloping algebra of a simple Lie algebra is free as a module over its center. More generally, in many cases it is important to know when a given associative algebra is free over a given subalgebra. We will discuss the solution of this problem for a class of "almost commutative" algebras which was recently obtained in our joint work with S.Ovsienko. Various applications of this result will be considered, in particular for the Yangians of the general linear Lie algebra. Yangians first appeared in the works of L.Fadeev and the St.-Petersburg school in their study of integrable models. They form a family of quantum groups related to the rational solutions of Yang-Baxter equation. Introduced generalization of the Kostant's theorem has a significant importance for the study of Harish-Chandra categories whose theory was developed in our joint works with Yu.Drozd and S.Ovsienko. These categories are defined for a pair, associative algebra and its subalgebra, and have strong links with the representation theory of Lie algebras, non-commutative geometry, representations of finite groups etc. We will discuss the basics as well as some recent developments in Harish-Chandra theory.