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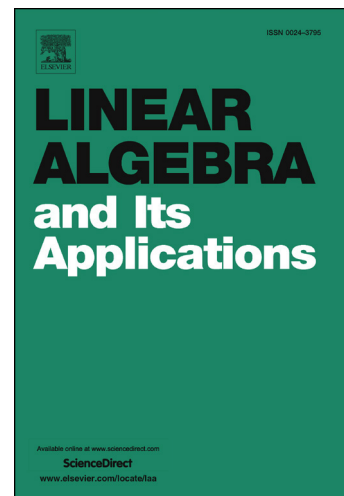
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Group gradings on the Jordan algebra of upper triangular matrices

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Abstract

Let G be an arbitrary group and let K be a field of characteristic different from 2. We classify the G -gradings on the Jordan algebra UJ_n of upper triangular matrices of order n over K . It turns out that there are, up to a graded isomorphism, two families of gradings: the elementary gradings (analogous to the ones in the associative case), and the so called mirror type (MT) gradings. Moreover we prove that the G -gradings on UJ_n are uniquely determined, up to a graded isomorphism, by the graded identities they satisfy.

Keywords: Jordan algebras, Group gradings, Upper triangular matrices.

MSC: 17C05; 17C99; 16W50; 17C50, 16R99

Introduction

Graded algebras were first introduced and studied in Commutative algebra in order to generalize properties of polynomial rings. The study of the gradings on associative algebras was initiated by Wall [13]. He described the finite dimensional graded simple algebras with grading group \mathbb{Z}_2 , the cyclic group of order 2. Much later, around 1985, Kemer developed the structure theory of the T-ideals (ideals of identities) in the free associative algebra, see for instance [8]. One of the principal ingredients of that theory is the study of \mathbb{Z}_2 -graded algebras and their graded identities. The theory developed by Kemer has since immensely influenced the research in PI theory, and motivated further study of gradings and on graded polynomial identities in associative algebras. Motivated in part

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