An application of the method of orthogonal completeness in graded ring theory. (English. Russian original) Zbl 1291.16039

Using a method of orthogonal completeness developed by K. I. Beidar and A. V. Mikhalev [Russ. Math. Surv. 40, No. 6, 51-95 (1986); translation from Usp. Mat. Nauk 40, No. 6(246), 79-115 (1985; Zbl 0603.06003)], the author proves a graded analog of a theorem of Herstein. Thus, if \( R \) is a group graded ring which is gr-prime and \( d \) is a homogeneous derivation such that \( d(x)d(y) = d(y)d(x) \) for any \( x, y \in R \), then either \( R \) is commutative or \( d^2 = 0 \). Moreover, a generalization is given for gr-semiprime rings, by showing that a homogeneous derivation extends to a homogeneous derivation of its complete graded right ring of quotients.

Reviewer: Constantin Năstăsescu (Bucureşti)

MSC:

16W50 Graded rings and modules (associative rings and algebras)
16N60 Prime and semiprime associative rings
16W25 Derivations, actions of Lie algebras

Keywords:
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