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LINEAR MAPS PRESERVING INVOLUTORY MATRICES ON FULL MATRIX RING

JINMING ZHOU
College of Science,
China University of Mining and Technology,
Xuzhou, Jiangsu, P. R. China
and Department of Mathematics,
Hefei Normal University, Hefei, Anhui, P.R. China

Abstract

Let n (≥ 2) be a positive integer, R be a unital commutative ring with 2 invertible. By $M_n(R)$ we mean the algebra consisting of all $n \times n$ matrices over R, and by e we denote the identity matrix in $M_n(R)$. The Jordan product is defined by $x \circ y = \frac{1}{2}(xy + yx)$. In this paper, we show that if a linear transformation ψ on $M_n(R)$ preserves involutory matrices, i.e. $(\psi(x))^2 = e$ whenever $x^2 = e$, then $\psi(e) \circ \psi(x \circ y) = \psi(x) \circ \psi(y)$ for any $x, y \in M_n(R)$. Further, if ψ is invertible and fixes e, then ψ is a Jordan automorphism.

Key Words : *Jordan automorphisms, Involutory matrices, Linear maps.*