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Monomial preserving derivations and Mathieu-Zhao subspaces

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Abstract

In this paper, we give a complete description of when the image of a monomial preserving derivation (or \mathcal{E} -derivation) of the polynomial algebra over a field of characteristic zero is a Mathieu-Zhao subspace. In particular we show that the LFED and LNEC conjectures hold for these derivations. The problem of whether the image of a derivation is a Mathieu-Zhao subspace arose from the study of the Jacobian conjecture.

Key words: Images of derivations; Mathieu-Zhao subspaces; Jacobian conjecture

MSC: 14R15, 13N15

1 Introduction

Throughout the paper, k is a field of characteristic zero and \mathbb{N} denotes the set of all natural numbers including zero. The notion of Mathieu-Zhao subspaces, a natural generalization of ideals, was first introduced by Zhao in [9] named after a conjecture of Mathieu in [6]. We will recall the definition of Mathieu-Zhao subspaces in the next section, and for more properties of them, we refer the reader to [10, 5].

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