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Permutation-like Matrix Groups with a Maximal Cycle of Length Power of Two

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Abstract

If every element of a matrix group is similar to a permutation matrix, then it is called a permutation-like matrix group. References [3], [4] and [5] showed that, if a permutation-like matrix group contains a maximal cycle such that the maximal cycle generates a normal subgroup and the length of the maximal cycle equals to a prime, or a square of a prime, or a power of an odd prime, then the permutation-like matrix group is similar to a permutation matrix group. In this paper, we prove that if a permutation-like matrix group contains a maximal cycle such that the maximal cycle generates a normal subgroup and the length of the maximal cycle equals to any power of 2, then it is similar to a permutation matrix group.

Key words: permutation-like matrix group, permutation matrix group, maximal cycle.

MSC2010: 15A18, 15A30, 20H20.

1 Introduction

Cigler [2, 3] showed that a permutation-like matrix group is not a permutation matrix group in general. A $d \times d$ matrix is called a *maximal cycle* if it is similar to a permutation matrix corresponding to the cycle permutation of length d . Cigler conjectured that:

Conjecture: If a permutation-like matrix group contains a maximal cycle, then it is a permutation matrix group.

Cigler [2, 3] proved that, if a permutation-like matrix group \mathcal{G} of dimension prime p contains a maximal cycle which generates a normal cyclic subgroup,

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