

RANK OF BICOMPLEX MATRICES AND SYSTEM OF ALGEBRAIC EQUATIONS

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ABSTRACT. In this paper, we study the rank of matrices of bicomplex numbers. The relationship between rank, idempotent column rank and idempotent row rank is examined. Then, the solution of a system of equations in bicomplex space is presented using a new technique. Moreover, we establish a necessary and sufficient condition for the existence of solutions of a system of equations in bicomplex space and derive some related results.

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Key words and phrases : Bicomplex number, bicomplex matrix, rank, linear transformation and system of equations.

1. Introduction

The theory of bicomplex numbers represents a captivating area of mathematical inquiry, offering a deeper understanding of number systems and their applications across different disciplines. The book of Price [1] offers an unparalleled and exhaustive examination of bicomplex numbers, while Segre [2] laid the groundwork for subsequent investigations into the properties and applications of bicomplex numbers. For the recent research in this area, we refer the reader to ([3, 4, 5, 6, 7, 8, 9]).

This paper utilizes the following approach: in section 1, we summarize some basics of bicomplex numbers, bicomplex linear transformation, and some necessary results which are used in this research. Section 2 deals with the rank of a bicomplex matrix and some related results. Also, it focuses on finding the solution of a system of bicomplex linear equations.

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