EIGENVALUE, EIGENVECTOR, AND EIGENMODE CHARACTERIZATION OF IRREDUCIBLE AND REDUCIBLE MATRIX IN THE MAX-PLUS ALGEBRA

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ABSTRACT

There are two types of graph in max-plus algebra based on the connectedness property, they are strongly and not strongly connected graph. Matrix representation of a strongly connected graph is called irreducible matrix, while matrix representation of not strongly connected graph is called reducible matrix. The results show that irreducible matrix has a unique and finite eigenvalue. Eigenvector corresponding to the eigenvalue of irreducible matrix is not unique, and they have finite values for each element. While eigenmode of irreducible matrix is not unique with all finite elements for each vector component. Reducible matrix does not necessarily have eigenvalue. If reducible matrix has eigenvalue, the eigenvalue is not necessarily unique with finite values. Furthermore, eigenvector corresponding to the eigenvalue of reducible matrix is not unique that contains at least one finite element. While eigenmode of regular reducible matrix is not unique with all finite elements for each vector component.

Keywords: max-plus algebra, eigenmode, irreducible matrix, reducible matrix, eigenvalue, eigenvector