163. The weakly sign symmetric po-matrix completion problems for patterns of digraphs of order 5 with upton 5 Arcs: performing wss po matrix completion on partial matrices obtained from non-isomorphic digraphs of order 5 with upton 5 arcs

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Abstract

Matrix completion problem involves determining whether or not a completion of a partial matrix exists for a certain class of matrices. As such a description of circumstances is sought in which choices for the unspecified entries may be made so that the resulting matrix is of the desired class. Matrix completion problems are applied in fields where some data is known and some other data entries are not known, but it is known that the full data matrix must have certain characteristics. Examples include Network analysis, System modelling by aiding in decision making processes and optimization strategies such as transportation, film industry and gaming. Graph theory has played an important role in the study of matrix completion problems. Positionally symmetric patterns have been studied by use of graphs while positionally asymmetric patterns have been studied by use of digraphs. A Wss Po-matrix is a matrix where if the off-diagonal elements have the property that if the entry in row i and column j is non-zero then the entry in row j and column i must have same sign or be zero and all its principal minors are non-negative. Our research aimed at studying the matrix completion of digraphs of order 5 with up to 5 arcs with a view of determining the digraphs whose partial matrices have zero completion into Wss Po-matrix. and those that do not have. Digraphs were utilized to create partial Wss Po- matrices, from which all principal minors were obtained. All principal minors obtained from the partial matrices were found to be non-negative indicating that all the partial matrices had zero completion into Wss Po-matrix. and therefore, none of the digraphs was found to have non-completion. Digraphs of order 5 with up to 5 arcs that could be completed and those that could not were analyzed.

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