ON THE PRINCIPAL PERMANENT RANK CHARACTERISTIC SEQUENCES OF GRAPHS AND DIGRAPHS

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Abstract. The principal permanent rank characteristic sequence is a binary sequence \( r_0 r_1 \cdots r_n \) where \( r_k = 1 \) if there exists a principal square submatrix of size \( k \) with nonzero permanent and \( r_k = 0 \) otherwise, and \( r_0 = 1 \) if there is a zero diagonal entry.

A characterization is provided for all principal permanent rank sequences obtainable by the family of nonnegative matrices as well as the family of nonnegative symmetric matrices. Constructions for all realizable sequences are provided. Results for skew-symmetric matrices are also included.

Key words. Symmetric matrix, Skew-symmetric matrix, Permanent rank, Principal permanent rank characteristic sequence, Generalized cycle, Matching, Minor.

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