Introduction to Rank-Function and its Applications

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Abstract

The notion of 'rank of a matrix' as defined by 'the dimension of subspace generated by columns of that matrix' over any field has limitation to be considered for a matrix over any other algebraic structure. The 'determinantal rank' defined by the size of largest submatrix having nonzero determinant, which is in fact equivalent to the column rank for any matrix over a field, was considered to be an alternative for the class of matrices over a commutative ring. Even this detrminantal rank or the McCoy rank are not so efficient in describing several properties of matrices like in the case of solvability of linear system. In the present talk, we discuss the introduction of 'rank function' associated with the matrix as defined in [3] and its characteristics. Also, we present rank condition for the existence of Drazin inverse for a square matrix over a commutative ring.

Keywords

rank, determinantal rank, rank function, generalized inverse, Drazin inverse

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