RANK FORMULAS FOR CERTAIN PRODUCTS OF MATRICES

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Abstract

For two matrix operations, called *quasi–direct sum* and *quasi–outer product*, we determine their deviations from multiplicative behaviour of the rank. The second operation arises in the determination of the function table for so–called sum–type functions such as the Hamming distance.

A consequence of the corresponding rank formula is, that the frequently used log rank can be a very poor bound for two–way communication complexity.

Instead, as was shown in [9], a certain *exponential rank* gives often excellent or even optimal bounds.