Extremal non-convertible fully indecomposable $(0,1)$-matrices

MIKHAIL BUDREVICH
Faculty of Algebra, Department of Mechanics and Mathematics
Lomonosov Moscow State University (Russia)
budrevich@yandex.ru

Permanent is a function which is similar to determinant by its definition but considerably different by its properties. Permanent of $(0,1)$-matrices has an important role as a computing function in combinatorics. In this work we restrict our attention to the permanent function on $(0,1)$-matrices only.

In [1] it was proved that any fully indecomposable not convertible $(0,1)$-matrix A of order n has at least $2n+3$ positive entries. In this talk we present the description of all such matrices with the minimal possible number of non-zero entries in matrix terms and in graph terms.

Structure of fully indecomposable non-convertible $(0,1)$-matrix with $2n+3$ positive elements is similar to sparse circulant matrices. Using this fact we compute permanent of all such matrices and show that these matrices give a series of examples of non-convertible matrices which satisfy the conditions: a matrix can not be represented in upper block triangular form and a matrix has minimal possible permanent.

This is a joint work with GREGOR DOLINAR (University of Ljubljana), ALEXANDER E. GUTERMAN (Lomonosov Moscow State University) and BOJAN KUZMA (University of Ljubljana).

REFERENCES

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