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Section:

13. Combinatorics

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Shevelev, Vladimir, Rostov State Building University, Russia

Enumeration of derangements belonging to prescribed cyclic class and containing a fixed subset of elements

Let S be a subset nxn-matrix position no two in the same row or column, without cycles. A maximal sequence of S-positions of form (a, b), (b, c), (c, d), .. ., (e, f) is called by a chain of S. Hence S is a chain or union of some chains. We prove that the number of matrix derangement diagonals (without positions of form (i, i)) belonging to prescribed cyclic class and having S as a subset depends on only multiset of chain legths in S, and obtain an explicit formula for such dependence. Appications to combinatorics of permutations with restricted position will be presented by means of the our method of arrangement index.