Mathematics > Combinatorics

The set of autotopisms of partial Latin squares

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Symmetries of a partial Latin square are determined by its autotopism group. Analogously to the case of Latin squares, given an isotopism Θ, the cardinality of the set $\mathcal{PLS}_{\Theta}$ of partial Latin squares which are invariant under Θ only depends on the conjugacy class of the latter, or, equivalently, on its cycle structure. In the current paper, the cycle structures of the set of autotopisms of partial Latin squares are characterized and several related properties studied. It is also seen that the cycle structure of Θ determines the possible sizes of the elements of $\mathcal{PLS}_{\Theta}$ and the number of those partial Latin squares of this set with a given size. Finally, it is generalized the traditional notion of partial Latin square completable to a Latin square.

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