

Automorphisms of equivalence relations

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Let $\mathfrak{S}(X)$ be a symmetric semigroup of all transformations of set X and let $Eq(X)$ be a set of all equivalence relations on a set X .

The transformation $f \in \mathfrak{S}(X)$ is called endomorphism of relation $\rho \subseteq X \times X$ if for all $a, b \in X$ condition $(a; b) \in \rho$ implies $(af; bf) \in \rho$.

The set of all endomorphisms of relation ρ is a semigroup relative to ordinary operation of composition transformations. This semigroup is called an endomorphisms semigroup of relation ρ and denoted through $E_\rho(X)$.

The different semigroups $E_\rho(X)$ of endomorphisms of binary relations and endomorphisms of relational systems have been studied by many authors (see e.g. [1-3]). So in [4] the semigroup $E_\rho(X)$, where ρ is an arbitrary equivalence relation on the set X , have been described.

In this case the problem of description of the group of all automorphisms of arbitrary equivalence relation naturally appears. Here, the group which is isomorphic to group of all automorphisms of equivalence relation is constructed.

Besides, some algebraic properties of the group of all automorphisms of equivalence relation are investigated.

References

1. Gluskin L.M. Polugruppi isotonnih preobrazovaniy // Uspehi matematicheskikh nauk. - 1961. - T. 16. - N. 5 (101). - S. 157-162. (In Russian)
2. Araujo J., Konieczny J. Dense relations are determined by their endomorphisms monoids // Semigroup Forum. - 2005. - V. 70. - P. 302-306.
3. Popov B.V., Kovaleva O.V. On a characterization of monounary algebras by their endomorphism semigroups // Semigroup Forum. - 2006. - V. 73. - P. 444-456.
4. Zhuchok Y.V. Endomorphisms of equivalence relations // 6th International Algebraic Conference in Ukraine, Abstracts. - 2007. - Kamyenets-Podilsky. - P.234-235.