

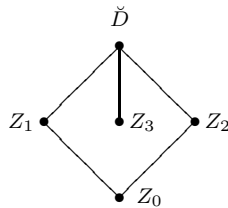
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Maximal Subgroups of a Class of Semigroups of Binary Relations

Recall that D belongs to the class of all elementary join X -semilattices if $D = \{\check{D}'\} \cup D'$, where the set D' of subsets of the set X satisfies the following conditions:

- a) $|D'| \geq 2$, $\check{D}' = \cup D'$;
- b) the set-theoretic union of any two different elements of the set D' is equal to $\check{D}'$;
- c) the set-theoretic intersection of any two elements of the set D' is different from a nonempty set;
- d) $D = D' \cup \{Z_0, \check{D}'\}$, where the set $\{\check{D}'\} \cup D'$ is an elementary join X -semilattice, and Z_0 is the smallest element of the semilattice D .

In this work, we describe all maximal subgroups of those semigroups of binary relations $B_X(D)$ for which the semilattices D satisfy the following conditions: $D = D' \cup \{Z_0, \check{D}'\}$, where $D' = \{Z_1, Z_2, Z_3\}$, $\{\check{D}'\} \cup D'$ is an elementary join X -semilattice and $Z_0 \cup Z_3 = \check{D}' = \check{D}$, while Z_0 is the smallest element of the set $\{Z_0, Z_1, Z_2\}$.



The class of such join X -semilattices is denoted by $\Sigma_1(X, 5)$.

Theorem. *If $D \in \Sigma_1(X; 5)$, then for any idempotent binary relation ε from the semigroup $B_X(D)$ the maximal subgroup $G_X(D; \varepsilon)$ is a cyclic group whose order does not exceed two.*

REFERENCES

1. Z. Avaliani, Idempotent elements of a complete semigroup of binary relations defined by semilattices of the class $\Sigma_1(X; 5)$. *Bull. Georgian Acad. Sci.* **164**(2001), No. 3, 440–442.

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2000 *Mathematics Subject Classification*: 20M10, 20M20.
Key words and phrases. Semigroups of binary relations.