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Book of abstracts



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LIST OF TOPICS

- Algebraic methods in geometry
- Differential geometry in the large
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- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
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ІНСТИТУТ
ОПРАЦІ

Extensions of semigroups by symmetric inverse semigroups of a bounded finite rank

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We study the semigroup extension $\mathcal{S}_\lambda^n(S)$ of a semigroup S by symmetric inverse semigroups of a bounded finite rank.

Definition 1. An subset D of a semigroup S is said to be ω -unstable if D is infinite and $aB \cup Ba \not\subseteq D$ for any $a \in D$ and any infinite subset $B \subseteq D$.

Definition 2. An subset D of a semigroup S is said to be *strongly ω -unstable* if D is infinite and $aB \cup Bb \not\subseteq D$ for any $a, b \in D$ and any infinite subset $B \subseteq D$.

It is obvious that a subset D of a semigroup S is strongly ω -unstable then D is ω -unstable.

Definition 3. An *ideal series* (see, for example, [1]) for a semigroup S is a chain of ideals

$$I_0 \subseteq I_1 \subseteq I_2 \subseteq \dots \subseteq I_n = S.$$

We call the ideal series (*strongly*) *tight* if I_0 is a finite set and $D_k = I_k \setminus I_{k-1}$ is an (strongly) ω -unstable subset for each $k = 1, \dots, n$.

A finite direct product of semigroups with tight ideal series is a semigroup with a tight ideal series and a homomorphic image a semigroup with a tight ideal series with finite preimages is a semigroup with a tight ideal series too [2].

Proposition 4. *Let S be a semigroup which admits a strongly tight ideal series. Then the direct power $(S)^n$ admits a strongly tight ideal series too.*

Theorem 5. *Let λ be an infinite cardinal and n be a positive integer. If S is a finite semigroup then*

$$I_0 = \{0\} \subseteq I_1 = \mathcal{S}_\lambda^1(S) \subseteq I_2 = \mathcal{S}_\lambda^2(S) \subseteq \dots \subseteq I_n = \mathcal{S}_\lambda^n(S)$$

is the strongly tight ideal series for the semigroup $\mathcal{S}_\lambda^n(S)$.

Theorem 6. *Let S be a semigroup which admits a strongly tight ideal series. Then for every non-zero cardinal λ and any positive integer $n \leq \lambda$ the semigroup $\mathcal{S}_\lambda^n(S)$ admits a strongly tight ideal series too.*

Definition 7 ([2]). An algebraic semigroup S is called *algebraically complete* in the class of semitopological semigroups \mathfrak{S} , if S with any Hausdorff topology τ such that $(S, \tau) \in \mathfrak{S}$ is H -closed in \mathfrak{S} .

Theorem 8. *Let S be an inverse semigroup which admits a strongly tight ideal series. Then for every non-zero cardinal λ and any positive integer $n \leq \lambda$ the semigroup $\mathcal{S}_\lambda^n(S)$ is algebraically complete in the class of Hausdorff semitopological inverse semigroups with continuous inversion.*

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