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Methods of Analysis”**

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LIST OF TOPICS

- Algebraic methods in geometry
- Differential geometry in the large
- Geometry and topology of differentiable manifolds
- General and algebraic topology
- Dynamical systems and their applications
- Geometric problems in mathematical analysis
- Geometric and topological methods in natural sciences
- History and methodology of teaching in mathematics

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ФІТБ ОНАФТ

The semigroup of star partial homeomorphisms of a finite deminsional Euclidean space

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We follow the terminology of [1, 2].

We shall introduce the notion of a star partial homeomorphism of a finite dimensional Euclidean space \mathbb{R}^n . By $\mathbf{St}_0(\mathbb{R}^n)$ we denote the set of all stars at the origin $\mathbf{0}$ of \mathbb{R}^n .

We describe the structure of the semigroup $\mathbf{PStH}_{\mathbb{R}^n}$ of star partial homeomorphisms of the space \mathbb{R}^n .

Proposition 1. $\mathbf{PStH}_{\mathbb{R}^n}$ is an inverse submonoid of the symmetric inverse monoid \mathcal{I}_c .

Proposition 2. (i) An element α of $\mathbf{PStH}_{\mathbb{R}^n}$ is an idempotent if and only if $\alpha: S \rightarrow S$ is the identity map for some star $S \in \mathbf{St}_0(\mathbb{R}^n)$.

(ii) The band $E(\mathbf{PStH}_{\mathbb{R}^n})$ is isomorphic to the semilattice $(\mathbf{St}_0(\mathbb{R}^n), \cap)$.

(iii) $\varepsilon \leq \iota$ in $E(\mathbf{PStH}_{\mathbb{R}^n})$ if and only if $\text{dom } \varepsilon \subseteq \text{dom } \iota$.

(iv) $\alpha \leq \beta$ in $\mathbf{PStH}_{\mathbb{R}^n}$ if and only if $\beta|_{\text{dom } \alpha} = \alpha$.

Proposition 3. Let be $\alpha, \beta \in \mathbf{PStH}_{\mathbb{R}^n}$. Then the following statements hold:

(i) $\alpha \mathcal{R} \beta$ in $\mathbf{PStH}_{\mathbb{R}^n}$ if and only if $\text{ran } \alpha = \text{ran } \beta$;

(ii) $\alpha \mathcal{L} \beta$ in $\mathbf{PStH}_{\mathbb{R}^n}$ if and only if $\text{dom } \alpha = \text{dom } \beta$;

(iii) $\alpha \mathcal{H} \beta$ in $\mathbf{PStH}_{\mathbb{R}^n}$ if and only if $\text{ran } \alpha = \text{ran } \beta$ and $\text{dom } \alpha = \text{dom } \beta$.

Proposition 4. $\mathbf{PStH}_{\mathbb{R}^n}$ is a bisimple inverse semigroup.

Corollary 5. Every two maximal subgroup in $\mathbf{PStH}_{\mathbb{R}^n}$ are isomorphic. Moreover every maximal subgroup in $\mathbf{PStH}_{\mathbb{R}^n}$ is isomorphic to the group of all star homeomorphisms of the unit ball \mathbf{B}_1 in \mathbb{R}^n .

Theorem 6. Every non-unit congruence on $\mathbf{PStH}_{\mathbb{R}^n}$ is a group congruence.

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