



International
Scientific Conference



Algebraic and Geometric Methods of Analysis



Devoted to 160 anniversary of
Dvytro Grave
(25.08.1863 - 19.12.1939)
Academician of the Ukrainian
Academy of Sciences, the
first director of the Institute of
Mathematics of NAS of Ukraine

May 29 – June 1, 2023
Odesa, Ukraine

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 and topological methods in natural sciences
- Geometric problems in mathematical analysis

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Definition 2. Let G, H be groups, $m \in \mathbb{Z}$ and $\gamma: H \rightarrow H$ be automorphism of order 2. Define the automorphism $\phi: G^{2m} \times H^m \rightarrow G^{2m} \times H^m$ by the formula

$$\phi(g_0, \dots, g_{2m-1}, h_0, \dots, h_{m-1}) = (g_{2m-1}, g_0, \dots, g_{2m-2}, h_1, h_2, \dots, h_{m-1}, \gamma(h_0)).$$

This automorphism ϕ generates homomorphism $\phi': \mathbb{Z} \rightarrow G^{2m} \times H^m$. The corresponding semidirect product $G^{2m} \times H^m \rtimes_{\phi'} \mathbb{Z}$ will be denoted $(G, H) \wr_{\gamma, m} \mathbb{Z}$.

Definition 3. Let \mathcal{P} be a minimal class of groups satisfying the following conditions:

- 1) $1 \in \mathcal{P}$;
- 2) if $A, B \in \mathcal{P}$, then $A \times B \in \mathcal{P}$;
- 3) if $A \in \mathcal{P}$ and $n \geq 1$, then $A \wr_n \mathbb{Z} \in \mathcal{P}$.

It was shown in [2] that if M has negative Euler characteristic, then fundamental groups of orbits of functions in $\mathcal{F}(M, P)$ are direct products of such groups for functions only on cylinders, disks and Möbius bands. Moreover, if M is either a 2-disk or a cylinder, then $\pi_1 \mathcal{O}(f, \partial M) \in \mathcal{P}$.

Theorem 4. Let M be a Möbius band and let $f \in \mathcal{F}(M, P)$. Then

$$\pi_1 \mathcal{O}(f, \partial M) \cong A \times (G, H) \wr_{\gamma, m} \mathbb{Z}, \text{ where } A, G, H \in \mathcal{P}.$$

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Codes from zero-divisor super- λ graph

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In coding theory, super- λ graphs were used to build linear codes. Thus, in order to see whether the zero-divisor graphs might be useful into this context, it is natural to study when zero-divisor graphs of some non elementary ring constructions are super- λ graphs. In this presentation, we show that there are various classes of rings whose zero-divisor graphs are super- λ . We apply these results to determine parameters of some linear codes associated to zero-divisor graphs.

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