



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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The multiplicities of non-acyclic SL_2 -representations and L -functions of twisted Whitehead links

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We briefly survey a joint work [2] with Léo Bénard, Ryoto Tange, and Anh T. Tran, which is a continuation of our previous work [8] (See also [6, 9, 1, 7] and [4, 5, 3]).

We consider a natural divisor on $SL_2\mathbb{C}$ -character varieties of knots and links, given by the so-called acyclic Reidemeister torsion. We provide a geometric interpretation of this divisor. We focus on the particular family of odd twisted Whitehead links W_{2k-1} , where we show that this divisor has multiplicity two. Moreover, we apply these results to the study of the L -functions of the universal deformations of representations over finite fields of twisted Whitehead links.

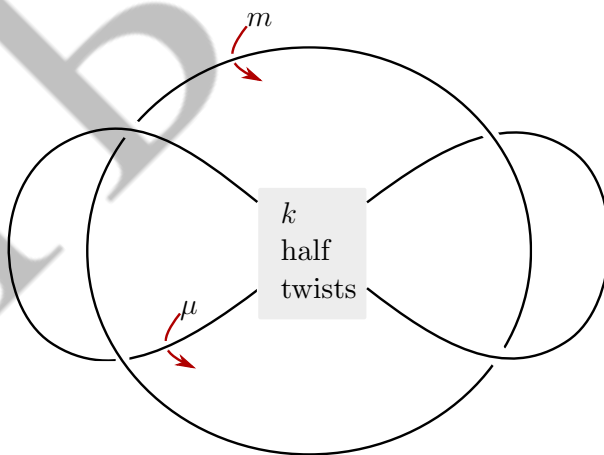


FIGURE 0.1. The twisted Whitehead link W_k

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Proximal connectedness. Spatially and descriptively connected spaces

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In this paper, we give results for spatially-connected spaces (X, δ) [5] (a widely-considered proximity space) and descriptively-connected spaces (X, δ_Φ) , a recent form of proximity space [3] with a number of applications. Definition 1 is analogous to connectedness in digital topology [2].

Definition 1. Let (X, δ) be a proximity space. Then two nonempty subsets A and B are δ -connected, provided there exists a finite family of subsets $\{E_i\}_{i=0}^n$ of X such that $A = E_0$, $B = E_n$, and $E_i \delta E_{i+1}$ for all $i = 0, 1, \dots, n - 1$. A proximity space (X, δ) is said to be connected, provided any pair of subsets A, B of X are δ -connected.

Example 2. In Figure 1.1, let $h, k : I \rightarrow K$ be continuous maps called homotopies in a space K . A homotopic class for different maps h (denoted by $[h] = \{h_0, \dots, h_i, \dots, h_{n-1}, h_n\}$ with $[n] = \text{mod } n \in \mathbb{Z}^+$) is a collection of $h_{i[n]}$ homotopic maps that have the same endpoints, namely, $h_i(0)$ and $h_i(1)$. The maps in $[h]$ are spatially near. Similarly, the maps in $[k]$ are spatially near. However, the homotopy classes $[h], [k]$ are spatially far. Also, from Definition 1,

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