Book of Abstracts

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OF THE

NIGERIAN MATHEMATICAL SOCIETY (NMS)

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Venue : Department of Mathematics
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A: Algebra and Combinatorics

A1: ADVANCES ON THE ALGEBRAIC PROPERTIES OF GROUP INVARIANT OPERATORS IN PERSISTENT HOMOLOGY

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Abstract

Persistent topology and homology are relevant mathematical tools in topology data analysis. It is a new approach to processing digital data, focusing on the fact that topological properties are quite important for efficient data comparison. As a matter of fact, in many applications, data can be represented by continuous real-valued functions defined on a topological space X ,and persistent homology can be efficiently used to compare these data by describing the homological changes of sub-level set of those functions. However persistent homology is invariant under the action of the group Homeo(X) of al selfhomeomorphism of X, while in many cases, an invariance with respect to a proper subgroup G of Homeo(X) is preferable. Interestingly, it has been recently proved that this restricted invariance can be obtained by applying G-invariant non-expansive operator to the considered functions. As a consequence. in order to proceed along this line of research we need methods to build G-invariant non- expensive operators. According to this perspective. in this paper we prove some new results about the algebra of GINOs.

Keywords: Filtering function. Natural pseudo- distance. Group action. Group invariant non- expansive operator. Persistent homology. Topological data analysis.

A2: Distinct Riemann Integral Having Solutions Forming Abelian Group

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Abstract

One of the distinct ideas behind first defining group by Galois in 1830 is to challenge mathematical intuition rather than verifying it, that is, to predict solutions of differential equations. In this research work, we produce Riemann Definite Integrals having solutions forming abelian group. It was discovered that; $\int_a^a (n \pm x^{k-1})dx$ where $b-a=k$ and $n \in \mathbb{Z}\ \forall\ k>0$ upon integration with continuous substitution of $n \in \mathbb{Z}$ produced a multiple of $\mathbb{Z}$ following the condition that $b>a$ and $b-a=k$. This Riemann Definite Integral satisfies the properties of group as a normal set of integers that satisfies the property of group and also abelian.

Keywords & Phrases: Group, Idempotent, Riemann Integral, Abelian
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