

”The Trans-Carpathian Seminar on Geometry & Physics”

(See also the [Geometry & Physics @ DFT](#) seminar homepage)

Date: Wednesday, Nov. 6, 2024, 15:15 EET

Location: online via Zoom

Speaker: **Prof. Mikołaj Rotkiewicz** (University of Warsaw, Faculty of Mathematics, Informatics and Mechanics)

Title: **Exploring the structure of higher algebroids**

Abstract: The notion of a *higher-order algebroid*, as introduced by Józwickowski and Rotkiewicz in “Higher-order analogs of Lie algebroids via vector bundle comorphisms” (SIGMA 2018), generalizes the concepts of a higher-order tangent bundle $T^k M \rightarrow M$ and a (Lie) algebroid. This idea is based on a (vector bundle) comorphism approach to (Lie) algebroids and the reduction procedure of homotopies from the level of Lie groupoids to that of Lie algebroids. In brief, an alternative description of a Lie algebroid $(A, [,], \#)$ is a vector bundle comorphism ‘kappa’, defined as the dual of the Poisson map from T^*A to TA^* (contraction with the Poisson bivector) associated with the Lie algebroid A . The framework of comorphisms has proven to be a suitable language for describing higher-order analogues of Lie algebroids from the perspective of the role played by (Lie) algebroids in geometric mechanics.

In my talk, I will introduce the notion of higher algebroids and, drawing from recent preprint [MR2024], explain how to uncover the classical algebraic structures that underpin the intricate description of higher-order algebroids via comorphisms. Specifically, in the case $k = 2$, I will demonstrate a one-to-one correspondence between higher-order Lie algebroids and pairs consisting of a two-term representation (up to homotopy) of a Lie algebroid and a morphism to the adjoint representation of that algebroid.

[MR2024] Mikołaj Rotkiewicz, *Exploring the Structure of Higher Algebroids*, 2024, arXiv:2408.02194.