

Další seminář z algebry se koná 8.11.2018 od 13.00 v posluchárně M5.

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Categorified cyclic operads in nature

Abstrakt:

In this talk, I will introduce a notion of categorified cyclic operad and justify the need of such a notion by exhibiting its place and use “in nature”.

Categorified cyclic operads are like symmetric monoidal categories, in that they guide an interplay of commutativity and associativity, but they are more restrictive, as they allow less instances of these two isomorphisms. In particular, the coherence conditions of symmetric monoidal categories do not ensure coherence of categorified cyclic operads, the hexagon of Mac Lane not even being well-defined in the latter setting. The coherence conditions that we do take from Mac Lane are the pentagon and the requirement that the commutator isomorphism is involutive, but we need much more in order to ensure coherence: we need two more mixed coherence conditions, a hexagon (which is not the hexagon of Mac Lane) and a decagon, as well as three more conditions which deal with the action of the symmetric group.

I will first give an example of a categorified cyclic operad in the form of an easy generalisation of the structure of profunctors of Bénabou.

I will then show how to exploit the coherence conditions of categorified cyclic operads in proving that the Feynman category for cyclic operads, introduced by Kaufmann and Ward, admits an odd version.

I will finish with combinatorial aspects of categorified cyclic operads, i.e. with their possible characterisations in convex and discrete geometry. This investigation aims at finding polytopes which describe the coherences of categorified cyclic operads, in the same way as the geometry of symmetric monoidal categories is demonstrated by permutoassociahedra.

