

Announcement

Oberseminar Geometrie

22nd of June 2022 at 2:15pm CEST/CES

Zoom

<https://uni-wuerzburg.zoom.us/j/96587647828?pwd=ZjliUHpkd3J2cDlpVFBYRmlrYkRMZz09>

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Frobenius objects in categories of relations and spans

Frobenius algebras can be given a category-theoretic definition in terms of the monoidal category of vector spaces, leading to a more general definition of Frobenius object in any monoidal category. In this talk, I will describe Frobenius objects in categories where the objects are sets and the morphisms are relations or spans. These categories can be viewed as toy models for the symplectic category. The main result is that, in both cases, it is possible to construct a simplicial set that encodes the data of the Frobenius structure. The simplicial sets that arise in this way satisfy conditions that are closely connected to the 2-Segal conditions of Dyckerhoff-Kapranov and Galvez-Carrillo-Kock-Tonks.

Commutative Frobenius objects in these categories give surface invariants that can be Boolean or natural number valued. I will give some explicit examples where the invariants can be computed.

This work is a very small first step in a bigger program aimed at better understanding the relationship between Poisson/symplectic geometry and topological field theory. Part of the talk will be devoted to giving an overview of this program. This is based on work with Ruoqi Zhang (arXiv:1907.00702), with Ivan Contreras and Molly Keller (arXiv:2106.14743), and works in progress with Ivan Contreras, Adele Long, Sophia Marx, and Walker Stern.

Invited by Madeleine Jotz Lean