Julius-Maximilians-
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MUΦX Lehrstuhl

Announcement

Seminar on Deformation Quantization and Geometry

20. 10. 2023 at 2pm CEST/CET

Seminarroom SE 30

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Grothendieck-Rings of Grothendieck Verdier Categories

We motivate Grothendieck-Verdier duality on a category by considering categories of bimodules $\mathscr{A} - \mathscr{A} - \mathsf{Bimod}$ over an algebra $\mathscr{A}$. Here the well known notion of rigid duality can be shown to be insufficient and instead of a representation of $\mathrm{Hom}_{\mathscr{A},\mathscr{A}}(- \otimes_{\mathscr{A}} N, \mathscr{A})$ for the monoidal unit $\mathscr{A}$ and a bimodule $\mathscr{A} - \mathscr{A} - \mathsf{Bimod}$ as we would expect for a rigid category, we obtain one for $\mathrm{Hom}_{\mathscr{A},\mathscr{A}}(- \otimes_{\mathscr{A}} N, \mathscr{A}^*)$ for an algebra $\mathscr{A}^* \neq \mathscr{A}$.

In general a Grothendieck-Verdier structure on a category $\mathfrak{C}$ yields a dualizing functor $\mathsf{D}\colon \mathfrak{C} \to \mathfrak{C}$ which represents $\mathrm{Hom}_{\mathfrak{C}}(- \otimes X, K)$ for some fixed object $K \in \mathfrak{C}$. This induces a map on the Grothendieck-Ring $\mathrm{Gr}(\mathfrak{C})$.

We consider the following questions:

- What algebraic structure does a Grothendieck-Verdier duality induce on the Grothendieck-Ring?
- Given a Grothendieck-Ring with some algebraic structure and a categorification of it, when does the categorification inherit a Grothendieck-Verdier structure?

We answer both questions in the case of semisimple categories by defining the structure of a gv-based ring and give some examples of such a ring structure as well as categorifications obtained from quivers.

Invited by Stefan Waldmann