Workshop
FrAGE 2023 – Fresh Algebra & Geometry

Titles & abstracts

October 12, 2023 | Universität Stuttgart

Samuel Creedon (IAZ)
Centraliser counterparts of the Farahat-Higman algebra

We summarise the construction of a new family of algebras which generalises the classical Farahat-Higman algebra related to the centers of symmetric group algebras. We highlight how certain structural information of these algebras is deduced from some underlying combinators, and conclude by presenting isomorphisms which establish explicit connections with the degenerate affine Hecke algebras.

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Anda Degeratu (IDSR)
Generalized McKay Correspondences

The McKay Correspondence states that there is a one-to-one correspondence between finite subgroups of SU(2) and ADE Dynkin diagrams. In this talk, I will talk about generalizations of this correspondence coming from crepant resolutions of Calabi-Yau orbifolds.

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Kevin Schlegel (IAZ)
Lifting exact structures in module categories

Let A be a finite dimensional algebra over a field k. A main interest of representation theory is to study the category $\operatorname{mod} A$ of finite dimensional A-modules. It is contained in the category $\operatorname{Mod} A$ of arbitrary A-modules. In several cases the structure of $\operatorname{mod} A$ is controlled by the existence of certain objects in $\operatorname{Mod} A$. E.g., there exist infinitely many non-isomorphic indecomposable objects in $\operatorname{mod} A$ if and only if there exists an indecomposable object in $\operatorname{Mod} A \backslash \operatorname{mod} A$. We show a result of similar fashion about exact structures, that is certain collections of short exact sequences in the ambient category. There exists a one to one correspondence between exact structures in $\operatorname{mod} A$, and exact structures in $\operatorname{Mod} A$ which are closed under limits and have enough injective objects. In particular, exact structures in $\operatorname{mod} A$ are always controlled by objects in $\operatorname{Mod} A$.

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Ivan Solonenko (IGT)
Complexification of projective spaces over real division algebras

I will talk about a geometric construction that allows to complexify a projective space over any normed real division algebra, namely over $\mathbb{R}$, $\mathbb{C}$, $\mathbb{H}$, or $\mathbb{O}$. This construction produces a complex projective variety and has a number of remarkable geometric properties related to various branches of differential geometry. The talk is going to be very accessible with only basic linear algebra knowledge required.