Program, SMS höstmöte, 18 november 2022

Mötet äger rum via Zoom
Meeting ID: 688 1255 5960
Passcode: SMS22

Titlar och sammanfattningar till föredragen finns på nästa sidor.

13.15–14.00	Søren Galatius	SMS Distinguished Lecture 2022
14.10–14.35	Lukas Gustafsson	
14.40–15.05	Helena Jonsson	
15.10–15.35	Isaac Ren	
15.40–16.05	Markus Thuresson	
16.10–16.40	Medlemsmöte	Dagordning finns i separat dokument

Søren Galatius (University of Copenhagen)

Recent advances in high-dimensional manifolds

In this lecture, intended for non-specialists, I will motivate and explain some recent developments in manifold theory, with an emphasis on dimension 6 and higher.

Lukas Gustafsson (KTH)

Algebraic Geometry and Maximum Likelihood Estimation

In statistics, discrete probability distributions and gaussians centered at 0 are fundamental. The collection of n-variate discrete and centered gaussian distri- butions on can be modeled by the probability simplex and the cone of positive definite matrices respectively. A problem in statistics is to maximize the log- likelihood function restricted to a semi-algebraic subset of these models, given some statistical data. We approach this problem from an angle of applied al- gebraic geometry/nonlinear algebra. Transitioning to the complex numbers we may instead count the number of critical points, which we define to be the Maximum Likelihood Degree (ML-degree) of the corresponding subvariety. For those familiar, this concept is similar to the Euclidean Distance Degree (EDD) where the objective is instead the Euclidean distance. In the discrete case there are many nice results, such as the ML-degree being an Euler characteristic or the classification of all ML-degree 1 models where the maximum likelihood es- timate is rational. In my talk I will discuss these results and ideas for proving analogues in the Gaussian case.

Helena Jonsson (UU)

Birepresentations of bicategories of bimodules

The representation theory of bicategories is still quite new, and although attention has been turned to it during the last decade, there are not many examples of explicit classification of birepresentations.

A natural class of bicategories is offered by categories of bimodules over finite-dimensional associative algebras. However, bimodules categories are in most cases of wild type, and therefore difficult to study.

In this talk we shall see a family of algebras with tame bimodule category. I will briefly describe its combinatorial structure under the tensor product, and present a partial solution to the problem of classifying birepresentations

of the corresponding bicategory. A key to this classification is defining the notion of localization of birepresentations.

Isaac Ren (KTH)

Effective computation of relative homological invariants for functors over posets

We study functors over finite posets from the perspective of relative homological algebra. In particular, we study resolutions of functors not by free functors, but by an arbitrary fixed family of "relative free" functors. Under certain conditions, relative minimal resolutions exist and are unique, and the multiplicities of relative free functors in this minimal resolution are collected in so-called relative Betti diagrams, which we can then compute effectively using Koszul complexes. These relative Betti diagrams are of interest in topological data analysis, as sources for new invariants.

Markus Thuresson (UU)

Investigating quasi-hereditary structures using combinatorics of binary trees

Quasi-hereditary algebras arise naturally as axiomatizations of phenomena in the representation theory of complex semisimple Lie algebras. Typical examples are blocks of BGG category O, Schur algebras and algebras of global dimension less than or equal to 2.

A given associative algebra can have different quasi-hereditary structures, depending on a partial order on the set of isomorphism classes of simple modules. In the case of the algebra of upper triangular matrices, Flores, Kimura and Rognerud recently showed that the number of quasi-hereditary structures is given by the Catalan number. In this talk, we will see how to use their results to completely describe the extensions between the so called "standard modules", the main protagonists of the representation theory of quasi-hereditary algebras.