Program, SMS höstmöte, 17 november 2023

Mötet äger rum i Lund, Matematikhuset, LTH, MH:Riesz kl 13–15 och MH:Hörmandersalen kl 15–19

Titlar och sammanfattningar till föredragen finns på nästa sidor.

13.15–14.00	Helge Holden	SMS Distinguished Lecture 2023
14.10–14.35	Robin van Haastrecht	
14.40–15.05	Jan Thomm	
15.05-15.30	Coffee break	
15.30–15.50	Jan Gundelach	
15.55–16.15	Thomas Munn	
16.20-16.40	Sjoerd de Vries	
16.55-17.15	Guillaume Bellier	
17.20-17.40	Ludvig Olsson	
17.50–18.20	Medlemsmöte	Dagordning finns i separat dokument
18.50	Middag på restaurangen The South Indian, Bantorget 7.	

Anmäl senast den 10 november till Lyudmyla Turowska
per e-post turowska@chalmers.se om du vill deltaga i middagen.

Helge Holden (Norwegian University of Science and Technology, NTNU)

Mathematical Modeling of Traffic Flow — Discrete versus Continuous

Vehicular traffic is one of most serious problems facing modern urban life. We will describe some classical mathematical models for traffic flow. There are two rather distinct ways to model traffic. On the one hand one can track individual vehicles, often called Follow-the-Leader models (FtL). This leads to systems of ordinary differential equations. However, if traffic is dense, a classical model is the so-called Lighthill–Whitham–Richards model (LWR), which is a nonlinear partial differential equation, more specifically, a hyperbolic conservation law. We study these models, and, in particular, the connection between the discrete (FtL) and the continuous (LWR) when traffic becomes dense. We will also briefly discuss traffic on a network or roads, and traffic on multilane roads.

Robin van Haastrecht (Chalmers and University of Gothenburg)

Limit formulas for quantum channels

In 2014, Lieb and Solovej studied quantum channels to establish an inequality in quantum entropy. For this they needed a limit formula to pass from these quantum channels to an integral. We studied this limit formula and applied it to different components fo the associated representation as well, generalizing their limit for these quantum channels.

Jan Thomm (Lund University)

Minimal A_∞-structure of the bounded derived category of the A_N quiver

The cohomology of a differential graded algebra canonically carries the structure of an A_∞-algebra, a main example being the Ext-algebra $\mathrm{Ext}^\star_Q(M,M)$ of a representation M of a quiver Q. If M is an additive generator of $\mathrm{rep}(Q)$, we aim to understand how the A_∞-structure of $\mathrm{Ext}^*_Q(M,M)$ relates to the Auslander–Reiten quiver of $\mathrm{rep}(Q)$. More precisely, the aim is to examine if the irreducible morphisms and Auslander–Reiten sequences generate the Ext-algebra $\mathrm{Ext}^*(M,M)$ as an A_∞-algebra and if the higher multiplications are completely determined by their actions on these irreducible elements. We answer both questions in the case of the A_N quiver and establish a sharp bound for the vanishing of the higher multiplications.

Jan Gundelach (Chalmers and University of Gothenburg)

Embeddings of L^p-operator algebras

A C^*-algebra is representable on a Hilbert space, that is, some space $L^2(\mu)$ for a measure space (Ω, Σ, μ) and thereby a well-behaved subobject of the Banach algebra $\mathcal{B}(L^2(\mu))$. If we allow for a different integrability parameter $p \in [1, \infty)$, such subobjects of $\mathcal{B}(L^p(\mu))$ are called L^p-operator algebras. This talk is about a joint work with Eusebio Gardella on L^p-embedding theory, that is, unital isometric homomorphisms, between L^p-operator algebras, for $p \neq 2$.

We show that such an embedding is automatically induced by a groupoid diagram and in stark contrast to well-known C^*-algebraic embedding results such as AF-embeddability or Kirchberg's embedding theorem. Indeed, while the tensor product $O_2 \otimes O_2$ is isomorphic to the Cuntz algebra O_2, our methods allow to show that, for $p \neq 2$, the L^p-analogue $O_2^p \otimes_p O_2^p$ does not even embed into O_2^p.

Thomas Munn (Lund University)

Minimal Submanifold of Riemannian Symmetric Spaces

Abstract: Minimal submanifolds of Riemannian manifolds are well studied, but the focus is usually on minimal surfaces of dimension two or hypersurfaces of codimension one. In this talk we introduce a new method for constructing families of minimal submanifolds of codimension two. We use this method to construct families for all of the classical Riemannian symmetric spaces (M,g). When (M,g) is compact tthis method produces compact minimal submanifolds. This is joint work with Sigmundur Gudmundsson (Lund University).

Sjoerd de Vries (Stockholm University)

Slopes of Hecke operators on Drinfeld modular forms

Drinfeld modular forms are function field analogues of classical modular forms. Slopes of modular forms have been studied since the 90s. They are defined as the p-adic valuations of the roots of the characteristic polynomial of the Hecke operator for the prime p. Recently, there has been much interest in slopes of Drinfeld modular forms. These slopes seem to have much structure but are still poorly understood, as I will try to explain in this talk.

Guillaume Bellier (Chalmers and University of Gothenburg)

Semi projectivity of soft C^*-algebra : P2 case

In order to study the possible decomposition of a C^*-algebra as a direct limit of semi projective C^*-algebra, the softening of a C^*-algebra has been considered. In this context, we present the non semi projectivity of the soft P2 algebra.

Ludvig Olsson (Stockholm University)

The Jordans-Schur Theorem and beyond

Jordans theorem is a statement restricting the types of finite groups appearing as subgroups of GL(n). We discuss the theorem, its implications, and generalizations to other algebraic groups. We also discuss a stronger version of the theorem where there is a finite set of "simple" algebraic groups containing every finite group up to conjugacy.