WABASH
EXTRAMURAL MODERN ANALYSIS
SEMINAR

January 30

11:15 am
at
Zoom Web Meeting
ID: 952 6581 2316, Passcode: 175396

Times given are Eastern Time,
which is currently local time for Central Indiana and Ohio.

11:15–11:30	*Conversation*
11:30–12:30	**Asymptotics of Cheeger constants and unitarisability of groups** *ANDREAS THOM, TU Dresden*
12:30–1:30	*More Conversation and Lunch*
1:30–2:30	**Multivariate Trace Inequalities Without a Semifinite Trace** *NICK LARACUENTE, U. Chicago*
2:30–...	*Farewells*

The purpose of Wabash Seminar talks is to present surveys of interest to all analysts, including graduate students and scholars working in areas far from the speaker's specialty. Come and meet your fellow analysts, learn what's going on, and spread the word.

$$\boxed{\text{Next Meeting: March 20}}$$

For further information contact

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Asymptotics of Cheeger constants and unitarisability of groups

ANDREAS THOM

Given a group Γ, we establish a connection between the unitarisability of its uniformly bounded representations and the asymptotic behaviour of the isoperimetric constants of Cayley graphs of Γ for increasingly large generating sets. The connection hinges on an analytic invariant $\mathrm{Lit}(\Gamma) \in [0, \infty]$ which we call the Littlewood exponent. Finiteness, amenability, unitarisability and the existence of free subgroups are related respectively to the thresholds 0,1,2 and ∞ for $\mathrm{Lit}(\Gamma)$. Using graphical small cancellation theory, we prove that there exist groups Γ for which $1 < \mathrm{Lit}(\Gamma) < \infty$. Further applications, examples and problems are discussed.

Multivariate Trace Inequalities Without a Semifinite Trace

NICK LARACUENTE

Trace inequalities have many uses for studying matrices and operators in semifinite von Neumann algebras. As trace inequalities yield strong applications to quantum information, connections between information theory and high-energy physics motivate analogous inequalities in type III. We re-express the generalized Araki-Lieb-Thirring and Golden-Thompson trace inequalities from (Sutter, Berta & Tomamichel 2017) in Haagerup and Kosaki L_p spaces, giving these relations meaning in algebras that lack a semifinite trace. As a motivating application noted in that work, the generalized Golden-Thompson inequality relates a decrease in quantum relative entropy under a completely positive, normal map to the map's approximate invertibility via universal recovery. We further show that non-decrease of relative entropy is equivalent to existence of an L_1 isometry implementing the map on both inputs to the relative entropy. This is based on joint work with Marius Junge.