Coordinate Methods for Nonselfadjoint Operator Algebras
Titles and Abstracts

Ken Davidson A Kaplansky theorem for free semigroup algebras

Abstract: A free semigroup algebra is the unital weak operator topology closed algebra generated by n isometries with pairwise orthogonal ranges. We show that the unit ball of the norm closed algebra is weakly dense in the whole ball if and only if the weak-$*$ closure agrees with the weak operator closure. This fails only when the weak closure is a von Neumann algebra but the weak-$*$ closure is not—and no examples of this phenomenon are known to exist.

Juliana Erlijman On braid type subfactors and generalisations

Abstract: I will discuss a few aspects related certain construction of families of subfactors from braid group representations and of their extension to subfactors from braided tensor categories, as well as some techniques for computing important invariants for some of the examples.

Jeff Grossman Minimum-phase preserving filters

Abstract: This talk is intended as part of the "open problems" session for the workshop. I'll begin by introducing causality and minimum phase conditions that come up in wave propagation and seismic imaging problems. In signal processing and imaging, we typically think of linear operators acting in L^2 as *filters*. The class of stationary (translation-invariant) linear filters corresponds to the convolution operators; and it is known that among these stationary filters, the ones which preserve minimum phase are precisely those described as convolution by a minimum phase function. So we ask the question: which nonstationary filters, if any, preserve minimum phase?

Steve Haataja Inverse semigroups and crossed products

Alan Hopenwasser Subalgebras of graph C*-algebras

Abstract: After a review of the groupoid associated with a graph C*- algebra, I will discuss the spectral theorem for bimodules. This says that a bimodule over a natural masa is determined by its spectrum iff it is generated by its Cuntz-Krieger partial isometries iff it is invariant under the gauge automorphisms. This contrasts notably with the situation for principal groupoids.

If the edges of the graph are suitably ordered then (for finite graphs), there is a natural nest and a natural nest subalgebra associated with the order. I will describe the Cuntz-Krieger partial isometries which are in the nest algebra and the spectrum of the nest algebra.

Aristides Katavolos Some results and problems on masa bimodules

Elias Katsoulis Isomorphisms of algebras associated with directed graphs

Abstract: Given countable directed graphs G and G', we show that the associated quiver algebras $\mathcal{A}_G$, $\mathcal{A}_{G'}$ are isomorphic as Banach algebras if and only if the graphs G are G' are isomorphic. For quiver algebras associated with graphs having no sinks or no sources, the graph forms an invariant for algebraic isomorphisms. We prove that the quiver algebra $\mathcal{A}_G$, associated with a graph G with no sources, is isometrically isomorphic to the disc algebra alg (G) of the universal Cuntz-Krieger graph C^*-algebra $C^*(G)$. This allows us to extend our classification scheme to subalgebras of graph C^*-algebras of Cuntz-Krieger type. We also show that given countable directed graphs G, G', the free semigroupoid algebras $\mathcal{L}_G$ and $\mathcal{L}_{G'}$ are isomorphic as dual algebras if and only if the graphs G are G' are isomorphic. In particular, similar free semigroupoid algebras are unitarily equivalent. For free semigroupoid algebras associated with locally finite directed graphs with no sinks, the graph forms an invariant for algebraic isomorphisms as well.

(Joint work with D. Kribs.)

David Kribs Directed graph operator algebras

Abstract: Every directed graph generates a family of operator algebras. They go by such names as Cuntz-Krieger or C-K-Toeplitz algebras, free semigroupoid algebras, quiver algebras, etc. Initial motivations came from dynamical systems, but now the study of these algebras has taken on a life of its own. Work on the nonselfadjoint subclass has been fruitful because it has been possible to link deep properties of the algebras with simple properties of the underlying directed graph in ways not possible for the C*-algebra case, and at the same time many new interesting examples have been discovered. I shall begin with a general discussion then touch on some specific results from joint works with Jury, Katsoulis and Power.

Philippe Larocque A spatial model for m λ-commuting isometries.

Abstract: In this talk, we will describe a model for m isometries satisfying $V_iV_j = \lambda_{i,j}V_jV_i$ (in a Hilbert space). Basically, to (almost) every such m-tuple, a subset of Z^m can be chosen in such a way that m isometries can be defined on it and these isometries are approximately unitarily equivalent to the original m isometries.

Laurent Marcoux On amenable operators

Abstract: A Banach algebra A is said to be amenable if all (continuous) derivations of A into dual Banach A-bimodules M are inner. In this talk, we shall discuss the amenability of norm-closed, singly generated algebras of operators on a Hilbert space.

(Joint work with D.R. Farenick [Regina] and B.E. Forrest [Waterloo].)

Justin Peters Cocycles on Cuntz-Krieger groupoids

Abstract: We examine $Z^1(\mathcal{G}, \mathbb{R})$ where $\mathcal{G}$ is a Cuntz-Krieger groupoid. We begin with a representation theorem for cocycles. This theorem yields a connection between the dynamics of the shift map on path space, and properties of cocycles.

In AF groupoids, the bounded cocyles and the integer-valued cocyles play important roles. We look at these classes in the Cuntz-Krieger context.

David Pitts Isomorphism invariants for subdiagonal triangular subalgebras of regular C^*-inclusions

Abstract: A pair of unital C^*-algebras $(\mathcal{C}, \mathcal{D})$ is a *regular C^*-inclusion* if $\mathcal{D}$ is a MASA in $\mathcal{C}$ whose normalizers span $\mathcal{C}$ and is such that every pure state on $\mathcal{D}$ has a unique extension to a state on $\mathcal{C}$. When this occurs, there exists a faithful conditional expectation $E : \mathcal{C} \to \mathcal{D}$. Following Arveson, a norm-closed subalgebra $\mathcal{A}$ with $\mathcal{D} \subseteq \mathcal{A} \subseteq \mathcal{C}$ is trianglar and subdiagonal if $\mathcal{A} \cap (\mathcal{A})^* = \mathcal{D}$ and $E|_{\mathcal{A}}$ is a homomorphism.

For C^*-diagonals, Kumjian introduced an isometric isomorphism invariant, which he called the *twist*. I will discribe a class $\mathcal{E}(\mathcal{A})$ of linear functionals on $\mathcal{A}$ which plays an role in the context of triangular subdiagonal algebras similar to that of the twist and which gives an invariant under bounded isomorphism. I will also discuss several questions about when this invariant is a complete invariant.

(Joint work with Allan Donsig.)

Baruch Solel Hardy algebras associated with W*-correspondences

Abstract: I shall discuss the construction of the Hardy algebras (which are the weak closures of the tensor algebras), their representations, cannonical models for the representations and Schur-class operator functions.

Ivan Todorov Normalisers, ternary rings of operators and reflexivity

Abstract: A ternary ring of operators is a subspace of $B(H, K)$ closed under the triple product $(T, S, R) \to TS^*R$. A ternary masa-bimodule is a ternary ring of operators which is also a bimodule for two maximal abelian selfadjoint algebras. In this talk a relation between ternary masa-bimodules and normalisers of some classes of operator algebras will be exhibited. The role ternary masa-bimodules play in operator synthesis will be described.