Analytic Function Spaces
Espaces de fonctions analytique
(Org: **Javad Mashreghi** (Laval University))

MAXIM BURKE, University of Prince Edward Island
Comonotone approximation and interpolation by entire functions

A theorem of Hoischen states that given a positive continuous function $\varepsilon : \mathbb{R} \to \mathbb{R}$, an integer $n \geq 0$, and a closed discrete set $E \subseteq \mathbb{R}$, any C^n function $f : \mathbb{R} \to \mathbb{R}$ can be approximated by an entire function g so that for $k = 0, \ldots, n$, and $x \in \mathbb{R}$, $|D^k g(x) - D^k f(x)| < \varepsilon(x)$, and if $x \in E$ then $D^k g(x) = D^k f(x)$. The approximating function g is entire and hence piecewise monotone. We determine conditions under which when f is piecewise monotone we can choose g to be comonotone with f (increasing and decreasing on the same intervals), and for the derivatives $D^k g$ to be comonotone with $D^k f$ when the latter are piecewise monotone.

RAPHAEL CLOUATRE, University of Manitoba
Non-commutative boundaries of multiplier algebras

It is a classical fact that the Shilov boundary of the disc algebra is the unit circle, which can then be identified as the character space of the smallest C^*-algebra containing an isometric copy of the disc algebra. Remarkably, the Shilov boundary can be obtained as the closure of Choquet boundary, consisting of those point evaluation characters admitting a unique representing measure. In this talk, I will discuss analogues of the aforementioned ideas for algebras of multipliers of nice complete Nevanlinna-Pick spaces on the unit ball. Since these algebras are typically not uniform algebras, this discussion involves non-commutative C^*-algebras. Nevertheless, there are meaningful non-commutative versions of the Choquet and Shilov boundaries in such a context as well, and I will identify these objects explicitly. I will also discuss the closely related concept of hyperrigidity, which is inspired by classical approximation theory results and is at the heart of a yet unresolved conjecture of Arveson. This is joint work with Michael Hartz.

RICHARD FOURNIER, Dawson College (Montreal)
Remarks on an interpolation formula

I will discuss some aspects of an interpolation formula for algebraic polynomials on the unit circle obtained in a joint paper with Dryanov and Ruscheweyh in 2007.

PAUL GAUTHIER, Université de Montréal
Approximation by Random Complex Polynomials and Rational functions

We seek random versions of some classical theorems on complex approximation by polynomials and rational functions, as well as investigate properties of random compact sets in connection with complex approximation. This is the result of a summer project with undergraduate students Simon St-Amant and Jérémie Turcotte.

JAVAD MASHREGHI, Laval University
Periodic solutions of linear systems

We show that under a unique set of initial values, the output response to a periodic input is pure periodic (no vanishing term). Main tools are the quotient operator and the Laplace transform. Interestingly enough, this is a pure mathematics theorem which was obtained via electrical measurements in an engineering lab.

Joint work with A. Khajehoddin and M. Daryaei.

GABRIEL PRAJITURA, SUNY Brockport
Chaos and entropy in Hilbert Spaces

We will discuss various concepts of chaos in the context of linear dynamics and how we can bring some entropy to the party.

EDWARD TIMKO, University of Manitoba
A Classification of n-tuples of Commuting Isometries

Let $\mathbb{V}$ denote an n-tuple of shifts of finite multiplicity, and denote by $\mathrm{Ann}\,(\mathbb{V})$ the ideal consisting of polynomials p in n complex variables such that $p(\mathbb{V}) = 0$. If $\mathbb{W}$ on $\mathfrak{K}$ is another n-tuple of shifts of finite multiplicity, and there is a $\mathbb{W}$-invariant subspace $\mathfrak{K}'$ of finite codimension in $\mathfrak{K}$ so that $\mathbb{W}|\mathfrak{K}'$ is similar to $\mathbb{V}$, then we write $\mathbb{V} \lesssim \mathbb{W}$. If $\mathbb{W} \lesssim \mathbb{V}$ as well, then we write $\mathbb{W} \approx \mathbb{V}$.

In the case that $\mathrm{Ann}\,(\mathbb{V})$ is a prime ideal we show that the equivalence class of $\mathbb{V}$ is determined by $\mathrm{Ann}\,(\mathbb{V})$ and a positive integer k. More generally, the equivalence class of $\mathbb{V}$ is determined by $\mathrm{Ann}\,(\mathbb{V})$ and an m-tuple of positive integers, where m is the number of irreducible components of the zero set of $\mathrm{Ann}\,(\mathbb{V})$.

RUHAN ZHAO, SUNY Brockport
On Berezin type operators and Toeplitz operators

In this talk we introduce a type of integral operators associated with a positive measure and resembling the Berezin transforms on the unit ball. Boundedness and compactness of these Berezin type operators between weighted Bergman spaces are characterized using Carleson measures. It has been found that the results are closely relative to those of Toeplitz operators between weighted Bergman spaces. This is a joint work with Gabriel Prajitura and Lifang Zhou.

NINA ZORBOSKA, University of Manitoba
Unitary weighted composition operators on reproducing kernel Hilbert spaces of holomorphic functions

Weighted composition operators play an important role when determining the surjective isometries on some Banach spaces of functions. In this talk I will present a characterization of the class of unitary weighted composition operators acting on a special family of Hilbert spaces of holomorphic functions. I will also mention some general geometric aspects of these types of investigations that are closely related to the problems on classification of reproducing kernel Hilbert spaces.