Complex analysis, Harmonic analysis and Operator theory

(Org: **Marcu-Antone Orsoni** (Université Laval) and/et **Pierre-Olivier Parisé** (Université du Québec à Trois-Rivières))

ABDEL RAHMAN AL-ABDALLAH, Brandon University

SHAHRIAR ASLANI, University of Toronto

ILIA BINDER, University of Toronto
Schrödinger operators with small quasiperiodic potentials: comb domains

In the talk, we discuss a characterization of the spectra of Schrödinger operators with small quasiperiodic analytic potentials in terms of their comb domains. We will also discuss action variables motivated by the integrable Korteweg-de Vries (KdV) system. The talk is based on joint work with D. Damanik, M. Goldstein, and M. Lukic.

ALEX BRUDNYI, University of Calgary

ALMAZ BUTAEV, University of The Fraser Valley

ANA ČOLOVIĆ, Washington University in St. Louis

SETAREH ESKANDARI, Umea University

PAUL GAUTHIER, Université de Montréal

DAMIR KINZEBULATOV, Université Laval

POORNENDU KUMAR, University of Manitoba

YU-RU LIU, University of Waterloo

JAVAD MASHREGHI, Université Laval

MAËVA OSTERMANN, Université de Lille

THOMAS RANSFORD, Université Laval
Double-layer potentials, configuration constants and applications to numerical ranges

We consider estimates $\|p(T)\| \leq K \sup_{z \in \Omega} |p(z)|$, where T is a Hilbert-space operator, p is a polynomial and Ω is a compact convex set containing the numerical range of T. We show that the well-known Crouzeix–Palencia bound $K \leq 1 + \sqrt{2}$ can be improved to $K \leq 1 + \sqrt{1 + a(\Omega)}$, where $a(\Omega)$ is what we call the analytic configuration constant of Ω. The latter is an analytic analogue of the classical configuration constant $c(\Omega)$ arising in the theory of double-layer potentials. A celebrated result of Neumann, dating back to 1877, states that $c(\Omega) < 1$ unless Ω is a triangle or a quadrilateral. Among other results, we prove that, in our case, we always have $a(\Omega) < 1$. Consequently, equality never holds in the Crouzeix–Palencia bound. (Joint work with Bartosz Malman, Javad Mashreghi and Ryan O'Loughlin.)

ERIC SAWYER, Mc Master University

RASUL SHAFIKOV, University of Western Ontario
Meromorphic convexity on Stein manifolds

Rational convexity of compact subsets in complex Euclidean spaces is important in the approximation theory. I will discuss generalizations of rational convexity to Stein manifolds. I will then give a characterization of this type of convexity for a certain class of compacts in the spirit of Duval-Sibony, Guedj, and Nemirovski. This is joint work with B. Boudreaux and P. Gupta.

WILLIAM VERREAULT, University of Toronto
Fourier Decay of GMC Measures

The Fourier coefficients of multiplicative chaos measures appear naturally in the study of random matrices, QFTs, and even number theory. The harmonic analysis of the canonical GMC measure on the unit circle allowed Garban and Vargas to show that the associated Fourier coefficients tend to 0. The next step is to ask how fast this decay occurs, which corresponds to the Fourier dimension studied in fractal analysis. We compute the exact Fourier dimension of the circle-GMC measure, thereby proving a conjecture of Garban-Vargas based on a fourth moment computation. Our arguments are elementary, relying on a construction of an auxiliary, scale-invariant Gaussian field.

QUN WANG, University of Toronto

MAHISHANKA WITHANACHCHI, University of Calgary

NINA ZORBOSKA, University of Manitoba