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Ομιλητές

Βασίλειος Δασκαλογιάννης (Anatolia American University)

Shifted Hausdorff matrices on Hardy and Bergman spaces

We consider the classical Hausdorff matrix $\mathcal{K}_\mu$, induced by the moment sequence of a finite Borel measure in $(0,1)$, which is lower triangular. We apply the operation of "erasing the zeros and shifting up the entries of the $k-$th column of $\mathcal{K}_\mu$, $k-$places up". We obtain a new matrix Γ_μ, which is a generalization of the classical Hilbert matrix, and we provide necessary and sufficient conditions for the boundedness and compactness of Γ_μ on Hardy and Bergman spaces of the unit disc of the complex plane.

Κωνσταντίνος Ζάρβαλης (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

Hyperbolic self-maps with extremal rate

Let f be a holomorphic self-map of the upper half-plane $\mathbb{H}$ and consider its sequence $\{f^n\}$ of *iterates* defined by $f^0 = \mathrm{id}_{\mathbb{H}}$, $f^n = f^{n-1} \circ f$, $n \in \mathbb{N}$. If f has no fixed points inside $\mathbb{H}$, the Denjoy–Wolff Theorem certifies the existence of some $\tau \in \mathbb{R} \cup \{\infty\}$ such that $f^n(z) \to \tau$, as $n \to \infty$, for all $z \in \mathbb{H}$. Composing with automorphisms, we may always assume $\tau = \infty$. Depending on its angular derivative at ∞, f may be characterized as either *hyperbolic* or *parabolic*. For hyperbolic maps, it is known that $f^n(z)$ diverges to ∞ at least exponentially fast, for all $z \in \mathbb{H}$. The purpose of this talk is to examine the hyperbolic self-maps for which the rate is indeed exponential, and thus *extremal*. We will see that this extremal rate may be characterized in terms of various tools such as the Herglotz representation and the hyperbolic distance.

The contents of the talk stem from joint work with F. J. Cruz-Zamorano.

Ελευθέριος Θεοδοσιάδης (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

Geometric description of some Loewner chains with infinitely many slits

The chordal Loewner PDE describes the dynamics of a continuous and decreasing family of simply connected domains of the upper half-plane $\mathbb{H}$. In this talk, we present and describe geometrically, explicit solutions to the chordal Loewner equation associated with certain driving functions that produce infinitely many slits. Specifically, for a choice of a sequence of positive numbers $(b_n)_{n\geqslant 1}$ and points of the real line $(k_n)_{n\geqslant 1}$, we explicitly solve the Loewner PDE

$$\frac{\partial f}{\partial t}(z,t) = -f'(z,t) \sum_{n=1}^{\infty} \frac{2b_n}{z - k_n\sqrt{1-t}}$$

in $\mathbb{H} \times [0,1)$, with initial value $f(z,0) = z$. We also see that there is a close connection to the theory of semigroups of holomorphic self-maps of $\mathbb{H}$, and using techniques involving the harmonic measure, we analyze the geometric behaviour of its solutions, as $t \to 1^-$.

Χριστίνα Καραφυλλιά (Πανεπιστήμιο Δυτικής Μακεδονίας)

Uniformization of domains by circle domains

Koebe's conjecture asserts that every domain in the Riemann sphere is conformally equivalent to a circle domain, namely a domain whose boundary consists of points and circles. The conjecture was established for finitely connected domains by Koebe and for countably connected domains by He–Schramm, which is currently the best known result. We verify Koebe's conjecture for the classes of Gromov hyperbolic domains and inner uniform domains. Our result also resolves a conjecture of Bonk–Heinonen–Koskela.

Αθανάσιος Κουρούπης (KU Leuven, Βέλγιο)

Αναλυτικές επεκτάσεις σειρών Dirichlet

Η παρούσα ομιλία πραγματεύεται τη συμπεριφορά των σειρών Dirichlet στους τόπους όπου μπορούν να επεκταθούν ως αναλυτικές συναρτήσεις:

$$f(s) = \sum_{n \geq 1} a_n n^{-s}, \quad s = \sigma + it.$$

Θα ξεκινήσουμε με μια σύντομη εισαγωγή στη θεωρία, παρουσιάζοντας κλασικά αποτελέσματα των Bohr και Titchmarsh, και στη συνέχεια θα εξετάσουμε σύγχρονες γενικεύσεις, μελετώντας πότε μια τέτοια αναλυτική επέκταση ορίζεται από μια συγκλίνουσα σειρά Dirichlet.

Η ομιλία βασίζεται σε κοινή εργασία με τον Ole Fredrik Brevig.

Μυρτώ Μανωλάκη (University College Dublin)

Extremal problems in Hardy spaces

Optimal polynomial approximants are polynomials which heuristically approximate the reciprocal of an element in a given function space. They were first introduced in the 60s as a tool to address certain problems in signal processing and digital filter construction. Fifty years later, a renewed interest in the subject arose due to interesting connections to function theory, reproducing kernels and orthogonal polynomials. In this talk, we will focus on the study of optimal polynomial approximants in the Banach setting of the Hardy space H^p, where the theory is less well developed. In particular, we will discuss the behaviour of their zeros and see connections with some related extremal problems.

Joint work with C. Bénéteau, R. Cheng, C. Felder, D. Khavinson and K. Maronikolakis.

Κωνσταντίνος Μαρονικολάκης (Bilkent University)

Ταυτόχρονη προσέγγιση από πεπερασμένα γινόμενα Blaschke

Θα παρουσιάσω αποτελέσματα ταυτόχρονης προσέγγισης από πεπερασμένα γινόμενα Blaschke, τα οποία είναι ουσιαστικά συνδυασμοί κλασσικών αποτελεσμάτων των Καραθεοδωρή και Fisher στην θεωρία των γινομένων Blaschke. Αυτά τα αποτελέσματα ακολουθούν αντίστοιχη δουλειά που

έχει πραγματοποιηθεί σε διάφορους χώρους Banach ολόμορφων συναρτήσεων. Ως απόρροια, αποδεικνύουμε την ύπαρξη φραγμένων ολόμορφων συναρτήσεων που επιδεικνύουν καθολική συνοριακή συμπεριφορά.

Γεώργιος Νικολαΐδης (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

Generalized Integration Operators

Let $\mathrm{Hol}(\mathbb{D})$ be the space of analytic functions defined on the unit disc of the complex plane. The operator

$$V(f)(z) = \int_0^z f(\zeta)\, d\zeta, \qquad z \in \mathbb{D}\,,$$

is the famous Volterra operator defined for all $f \in \mathrm{Hol}(\mathbb{D})$. Let $n \in \mathbb{N}$. A natural generalization, introduced by N.Chalmoukis, is the family of operators

$$T_{g,a}(f)(z) = V^n \left(a_0 f g^{(n)} + a_1 f' g^{(n-1)} + \cdots + a_{n-1} f^{(n-1)} g' \right)(z)\,,$$

where V^n are n-iterates of the Volterra, $a = (a_0, \ldots, a_{n-1}) \in \mathbb{C}^n$ and $g \in \mathrm{Hol}(\mathbb{D})$. For a suitable choice of $a \in \mathbb{C}^n$, this family contains the well-known Pommerenke operator

$$T_g(f)(z) = \int_0^z f(\zeta) g'(\zeta)\, d\zeta\,.$$

Chalmoukis characterized the boundedness of $T_{g,a}$ acting between Hardy spaces $H^p \to H^q$ for $0 < p \leq q < \infty$. In this talk, we address the remaining case $0 < q < p < \infty$, providing complete criteria for the boundedness and compactness. Finally, we characterize the Schatten-von Neumann membership of $T_{g,a}$ acting on the Hilbert Hardy space and on standard weighted Bergman spaces.

This talk is partly based on joint work with N. Chalmoukis.

Φανή Παπαγεωργίου (Πανεπιστήμιο Κρήτης)

Volterra-type Integral Operators on Spaces of Analytic functions

The topic of this talk is the boundedness and closed range property on spaces of analytic functions of the well-known Volterra-type integral operators S_g and T_g, which are defined by

$$S_g f(z) = \int_0^z f'(w) g(w) dw,$$
$$T_g f(z) = \int_0^z f(w) g'(w) dw,$$

whose symbol g is an analytic function on the unit disc. These integral operators are related to the multiplication operator $M_g f(z) = g(z) f(z)$, since integration by parts gives $M_g f = f(0)g(0) + T_g f + S_g f$.

Specificaly, we extend the already known conditions on the symbol g for S_g to have closed range on the Hardy spaces H^p from the case $p \geq 1$ to the case $0 < p < 1$. Furthemore, we prove that the corresponding condition for S_g to have closed range also holds for other spaces of analytic functions, i.e. the well-known spaces $F(p, q, s)$ and the spaces $Q(1, p, a)$.

Moreover, we find the condition on g so that T_g is bounded on $Q(1, p, a)$ and we also prove that T_g never has closed range on $Q(1, p, a)$.

Γεώργιος Παπάζογλου (Πανεπιστήμιο Κύπρου)

Carleman integral formula on the annulus

A Carleman integral formula, unlike the Cauchy integral formula, represents a holomorphic function by means of its boundary values supported on a proper subset of uniqueness. In this talk, we discuss a Carleman integral formula supported on the inner circle of the boundary of the annulus $\{z \in \mathbb{C} : q < |z| < 1\}$. We present L. Aizenberg's and A. Vidra's joint result characterizing the space of holomorphic functions representable by this formula and extend Patil's theorem from the unit disc to the annulus.

Γεώργιος Στυλογιάννης (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

Integral operators and the Toeplitz algebra

We study the Toeplitz algebra $\mathcal{T}$, the C^*-algebra generated by the bounded Toeplitz operators on the Hardy space H^2. The central question is whether the generalized Volterra integral operator V_g is contained in $\mathcal{T}$. While a definitive answer remains elusive, we present substantial evidence supporting the inclusion of every V_g within $\mathcal{T}$.

Joint work with C. Bellavita.

Νικόλαος Τσιρίβας (Πανεπιστήμιο Θεσσαλίας)

Σύγχρονη προσέγγιση τελεστών μεταφοράς

Σε αυτήν την ομιλία παρουσιάζουμε ένα πρόσφατο αποτέλεσμα σε σχέση με ένα παλαιότερο αποτέλεσμα για την υπερκυκλικότητα του τελεστή μεταφοράς στο χώρο των ακεραίων συναρτήσεων. Στο παλαιότερο αποτέλεσμα η πυκνή τροχιά εξαρτάται από 2 δείκτες. Με το παρόν αποτέλεσμα η εξάρτηση μπορεί να πραγματοποιηθεί μόνον από τον ένα δείκτη. Το αποτέλεσμα έχει δημοσιευτεί πρόσφατα (2024).

Αργύριος Χριστοδούλου (Αριστοτέλειο Πανεπιστήμιο Θεσσαλονίκης)

The geometry of holomorphic iteration in the unit disc

Iteration theory in the unit disc was initiated by the Denjoy–Wolff Theorem, which states that the iterates of any holomorphic self-map of the disc converge to a unique "attracting" point. In this talk we present a study of the geometric aspects of this convergence to the attracting point, such as the rate and the angle of convergence. To do so, we extend a technique of Bracci and Roth that allows us to partially embed any sequence of iterates into a continuous semigroup of holomorphic self-maps of the disc. This is joint work with K. Zarvalis.