

Complex Analysis and Complex Geometry Days

Sabancı University, 23-24 August 2023



Invited Speakers:

Gökalp Alpan (Sabancı University)

Dan Coman (Syracuse University)

Sibel Şahin (Mimar Sinan Fine Arts University)

Özcan Yazıcı (Middle East Technical University)

Complex Analysis and Geometry Days (23-24 August, 2023) will be held in Sabancı University (İstanbul/Turkey). The workshop is focusing on complex analysis and complex geometry and their probabilistic aspects. Some travel funds are available for graduate students and postdoctoral fellows. For more information please contact us at tbayraktar@sabanciuniv.edu

Organizer:

Turgay Bayraktar (Sabancı University)

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Complex Analysis
and Complex Geometry Days
Sabancı University, 23-24 August 2023

Schedule

23 August, 2023

- Dan Coman 12.40-13.30 FENS G032
 Coffee break 13.30-14.30 FENS Longue
- Sibel Şahin 14.40-15.30 FENS G032

24 August, 2023

- Dan Coman 11.40-12.30 FENS G032
- Özcan Yazıcı 13.40-14.30 FENS G032
- Gökalp Alpan 14.40-15.30 FENS G032

Complex Analysis and Complex Geometry Days

Sabancı University
İstanbul, Turkey

August 23-24 2023

Extremal polynomials on Cantor type sets and fractals

Gökalp Alpan
Sabancı University

In this talk, I will give an overview of some results concerning orthogonal polynomials and Chebyshev polynomials on Cantor type sets and fractals. In particular, I will discuss the behavior of recurrence coefficients (for L2 case) and discuss norm estimates.

Spaces of holomorphic sections vanishing along subvarieties

Dan Coman
Syracuse University

Let L be a holomorphic line bundle on a compact normal complex space X of dimension n , let $\Sigma = (\Sigma_1, \dots, \Sigma_\ell)$ be an ℓ -tuple of distinct irreducible proper analytic subsets of X , and $\tau = (\tau_1, \dots, \tau_\ell)$ be an ℓ -tuple of positive real numbers. We consider the space $H_0^0(X, L^p)$ of global holomorphic sections of $L^p := L^{\otimes p}$ that vanish to order at least $\tau_j p$ along Σ_j , $1 \leq j \leq \ell$, and give necessary and sufficient conditions to ensure that $\dim H_0^0(X, L^p) \sim p^n$. We also discuss the convergence of the corresponding Fubini-Study currents and their potentials, and the distribution of normalized currents of integration along zero divisors of random holomorphic sections in $H_0^0(X, L^p)$ as $p \rightarrow \infty$. This is joint work with George Marinescu and Viêt-Anh Nguyễn.

Bergman kernels and Poincare series

Sibel Şahin
Mimar Sinan Fine Arts University

In this talk we will consider some special classes of analytic functions, namely de Branges-Rovnyak spaces and Smirnov class of sub-Bergman spaces, of both the unit disc and some more general domains in \mathbb{C} . In the first part of this talk we will see structure of de Branges-Rovnyak spaces in the setting of unit disc and finitely connected domains of \mathbb{C} . In the second part we will talk about the Smirnov classes of reproducing kernel Hilbert spaces via two very recent studies: the first one considers the Smirnov classes for de Branges-Rovnyak spaces $H(b)$ [1], and the second one is about the Smirnov class of sub-Bergman spaces and the range of defect operator on these spaces [2].

References:

- [1] Fricain E. Hartmann A. Ross W. Timotin D. The Smirnov Class for de Branges-Rovnyak Spaces, Results Math. 77:114, (2022).
 - [2] Şahin, S. The Smirnov Class for Sub-Bergman Hilbert Spaces, arXiv:2308.00492, (2023).
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Upper level sets of Lelong numbers on projective surfaces

Özcan Yazıcı

Middle East Technical University

Let T be a positive closed current of bidimension $(1, 1)$ with unit mass on a complex manifold X and $\nu(T, x)$ denote the Lelong number of T at $x \in X$. It is a remarkable result of Y.T. Siu that the upper level sets

$$E_\alpha(T) := \{x \in X \mid \nu(T, x) \geq \alpha\}$$

of Lelong numbers are analytic subvarieties of X of dimension at most 1 for any $\alpha > 0$. In the case that $X = \mathbb{P}^n$ it was shown that

$$E_\alpha^+(T) := \{x \in X \mid \nu(T, x) > \alpha\}$$

has certain geometric properties when α is large enough. In this talk, first we will go over these results. Then we will mention our recent results on the geometry of the set of points with large Lelong numbers on Hirzebruch surfaces. If time allows, we will talk about our ongoing work on the points with relatively small Lelong numbers. This is a joint work with A.U.Özgür Kişisel and supported by TÜBİTAK 3501 Proj. No. 120F084.
