

Complex Analysis Seminar, Winter Semester 2023-2024.

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Title:

On the membership of Conformal Mappings into Holomorphic Function Spaces.

Abstract: In this talk we will present some recent advancements in the theory of conformal mappings and will give some necessary and sufficient conditions for a conformal mapping to belong into the Hardy spaces $H^p(\mathbb{D})$, $p > 0$ and to the weighted Bergman Spaces $A_q^p(\mathbb{D})$. The motivation to give such characterizations comes from the definition of the classical Bloch space

$$\mathcal{B} = \{f \in H(\mathbb{D}) : \sup_{z \in \mathbb{D}} (1 - |z|^2) |f'(z)| < \infty\}$$

and the Koebe quarter theorem, which roughly states that a conformal mapping belongs to the Bloch space if and only if $f(\mathbb{D})$ lies into disks with arbitrarily large radii. To prove such characterizations for the Hardy and Bergman spaces which provide geometrical information about $f(\mathbb{D})$ we will use as tools some conformal invariants, such as the Harmonic Measure, the Hyperbolic Distance, and the Green's Function.

References

- [1] D.Betsakos, C.Karafyllia, N.Karamanlis, *Hyperbolic metric and membership of conformal maps in the Bergman space*, 2020 (preprint).
- [2] C.Karafyllia, *Hyperbolic distance and membership of conformal maps in the Hardy space*, Proc Amer. Math Soc.4 (2019), 113-124.