

SEMINARIO DE ANÁLISIS COMPLEJO (COMPLEX ANALYSIS SEMINAR)

Hyperbolic convexity of holomorphic level sets

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Abstract:

Given a holomorphic self-map f of the unit disk we consider

(i) the quotient of the density of the hyperbolic metric at a preimage z over the density at the image $f(z)$, and

(ii) the difference between the hyperbolic distance from some fixed z_0 to z and the distance from some fixed w_0 to $f(z)$.

We prove that the sublevel sets of these functions are convex with respect to the hyperbolic geometry of the disk. The result concerning (i) answers a question of Arango, Mejía and Pommerenke (2019), while (ii) seems more natural in more general contexts.

This is joint work with Pavel Gumenyuk.