Analysis Seminar

On the failure of the Denjoy-Wolff theorem in convex domains

By

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Abstract: The classical Denjoy-Wolff theorem has been a cornerstone in complex dynamics, and informally it states that if f:D → D is a holomorphic self-map of the unit disc D without fixed points, then there exists a point p ∈ ∂D such that any sequence of iterates of f converge uniformly on compacta to the constant map. This result has been generalized to many classes of domains in higher dimensions thanks to methods of hyperbolic geometry, however, to the best of our knowledge the only known class of domains where such a phenomenon fails were the product domains.

The goal of this talk is to explain our recent construction of non-trivial classes of "weakly" convex domains in where the Denjoy-Wolff theorem fails.

Although our examples are higher dimensional, our method is actually one dimensional and it is based on the Caratheodory prime ends theory and pathological boundary behaviour of certain Riemann maps.

This talk is based on joint work with Filippo Bracci:
https://arxiv.org/pdf/2507.10298

Date: April 28 Tuesday
Time: 14:00-15:00, GMT+3
Place: SA141