Workshop dedicated to the memory of Professor Gabriela Kohr
(3rd edition)
Geometric Function Theory in Several Complex Variables and Complex Banach Spaces

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Angular derivative problem for backward flow invariant domains of one-parameter semigroups.

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Abstract

The talk is based on a joint work with Maria Kourou and Oliver Roth, University of Würzburg, Germany; ArXiv:2303.00700. We address a version of Ahlfors' angular derivative problem for hyperbolic petals, i.e. for simply connected domains on which every element of a given holomorphic semiflow acts as a hyperbolic automorphism. In particular, on any such domain, the semiflow extends in a unique way to a flow. There is a one-to-one correspondence between the hyperbolic petals of a one-parameter semigroup in the unit disk and its boundary regular fixed points other than the Denjoy-Wolff point. We find a necessary and sufficient condition for the premodel associated to a boundary regular fixed point σ to be regular. The notion of premodel was introduced in 2000 by Pietro Poggi-Corradini, Ann. Acad. Sci. Fenn. Math. 25. The regularity of the premodel means that the map fixing σ and mapping the unit disk conformally onto the corresponding hyperbolic petal has finite (and automatically non-vanishing) angular derivative at σ. Our condition is given in terms of the hyperbolic geometry of the petal and backward dynamics of the one-parameter semigroup.