DEPARTAMENTO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

Facultad de Ciencias MATEMÁTICAS

Instituto de Matemática Interdisciplinar

SEMINARIO DE ANÁLISIS MATEMÁTICO Y MATEMÁTICA APLICADA

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Rigidity Properties for holomorphic maps

In this talk I will outline some recent results about what nowadays go under the name “rigidity properties” for holomorphic maps. The most classical result of such a type is the Schwarz Lemma. A boundary version of the Schwarz was due to Burn and Krantz in 1994, which proved that if a holomorphic self-map of the unit disc coincides with the identity up "little oh” 3 at the boundary point then it is the identity. Like the Schwarz lemma, such a result has been generalised to several contexts and to higher dimension. In the recent paper [1], we found a novel infinitesimal version of the Burns Krantz theorem, that is, if a holomorphic self-map of the unit disc preserves the infinitesimal Poincaré metric along a sequence converging to the boundary up to “little oh” order 1, then the map is an automorphism of the unit disc. Such a result has been generalised to several complex variables and for maps from different domains. The original Burns-Krantz theorem can be recovered by “integration” from the infinitesimal version. The basic ingredient in dimension one is a new Ahlfors-Schwarz theorem about conformal pseudometric, which roughly speaking, guarantees that a negatively curved conformal metric coincides with the Poincaré metric in case it equals to the Poincaré metric up to a certain order along a sequence converging to the boundary. In this talk, I will present the previous results, based on [1], [2] and [3], their generalisation and the idea of the proof for the one dimensional infinitesimal rigidity result.

[1] F. Bracci, D. Kraus, O. Roth, A new Schwarz-Pick Lemma at the boundary and rigidity of holomorphic maps, Adv. Math., 432, (2023), paper N. 109262 [2] F. Bracci, D. Kraus, O. Roth, The strong form of the Ahlfors—Schwarz lemma at the boundary , ArXiv:2310.05521v1 [3] F. Bracci, L. Kosinski, W. Zwonek, Slice rigidity property of holomorphic maps Kobayashi-isometrically preserving complex geodesics, J. Geom. Anal. 31 (2021), no. 11, 11292–11311.

Organized by: Departamento de Análisis Matemático y Matemática Aplicada and Instituto de Matemática Interdisciplinar (IMI)

Date: Wednesday, november 29, 2023,12:00h
Place: 222
Facultad de CC. Matemáticas, UCM