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Simultaneous linearization of commuting non-elliptic self-maps and generalized embeddability

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Abstract

This talk is based on results of joint works with Manuel D. Contreras and Santiago Díaz-Madrigal (University of Seville, SPAIN).

We study the structure of the centralizer for a non-elliptic holomorphic self-map $\varphi \in Hol(\mathbb{D})$ in the unit disc $\mathbb{D}$ and its relation with continuous dynamical structures. We prove that if the identity map is not isolated in the centralizer of φ, then φ possesses a property, which can be regarded as a "weaker" or "generalized version" of embeddability: namely, in such a case, φ is necessarily univalent and its centralizer contains a non-trivial continuous one-parameter semigroup of holomorphic self-maps. We further show that for hyperbolic self-maps, the "generalized embeddability" is equivalent to the standard one (i.e. to the existence a non-trivial continuous one-parameter semigroup containing φ). This is not the case for parabolic self-maps, but we are able to give additional sufficient conditions ensuring that the self-map is embeddable in the usual sense.

Our approach is based on the theory of holomorphic models and on simultaneous linearization techniques for commuting self-maps.