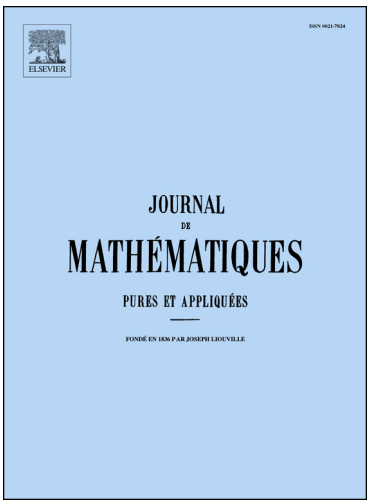

Topological invariants for semigroups of holomorphic self-maps of the unit disc

Filippo Bracci, Manuel D. Contreras, Santiago Díaz-Madrigal

PII: S0021-7824(16)30047-2
DOI: http://dx.doi.org/10.1016/j.matpur.2016.04.008
Reference: MATPUR 2844

To appear in: *Journal de Mathématiques Pures et Appliquées*

Received date: 4 July 2015

Please cite this article in press as: F. Bracci et al., Topological invariants for semigroups of holomorphic self-maps of the unit disc, *J. Math. Pures Appl.* (2016), http://dx.doi.org/10.1016/j.matpur.2016.04.008

TOPOLOGICAL INVARIANTS FOR SEMIGROUPS OF HOLOMORPHIC SELF-MAPS OF THE UNIT DISC

FILIPPO BRACCI[†], MANUEL D. CONTRERAS[‡], AND SANTIAGO DÍAZ-MADRIGAL[‡]

Résumé. Soient (φ_t), (ϕ_t) deux semi-groupes à un paramètre d'endomorphismes holomorphes du disque unité $\mathbb{D} \subset \mathbb{C}$. Soit $f : \mathbb{D} \to \mathbb{D}$ un homéomorphisme. Nous montrons que si $f \circ \phi_t = \varphi_t \circ f$ pour tout $t \geq 0$, alors f s'étend à un homéomorphisme de $\overline{\mathbb{D}}$ en dehors des arcs de contact exceptionnels maximaux (en particulier, si l'on considère des semi-groupes elliptiques, f s'étend toujours à un homéomorphisme de $\overline{\mathbb{D}}$). En utilisant ce résultat, nous étudions les invariants topologiques pour les semi-groupes à un paramètre d'endomorphismes holomorphes du disque unité.

Abstract. Let (φ_t), (ϕ_t) be two one-parameter semigroups of holomorphic self-maps of the unit disc $\mathbb{D} \subset \mathbb{C}$. Let $f : \mathbb{D} \to \mathbb{D}$ be a homeomorphism. We prove that, if $f \circ \phi_t = \varphi_t \circ f$ for all $t \geq 0$, then f extends to a homeomorphism of $\overline{\mathbb{D}}$ outside exceptional maximal contact arcs (in particular, for elliptic semigroups, f extends to a homeomorphism of $\overline{\mathbb{D}}$). Using this result, we study topological invariants for one-parameter semigroups of holomorphic self-maps of the unit disc.

Contents

2010 *Mathematics Subject Classification.* Primary 37C10, 30C35; Secondary 30D05, 30C80, 37F99, 37C25.

Key words and phrases. Semigroups of holomorphic functions; topological invariants; topological normal forms.

[†] Partially supported by the ERC grant "HEVO - Holomorphic Evolution Equations" n. 277691.

[‡] Partially supported by the *Ministerio de Economía y Competitividad* and the European Union (FEDER), projects MTM2012-37436-C02-01 and MTM2015-63699-P, and by *La Consejería de Educación y Ciencia de la Junta de Andalucía*.