XX Encuentros de Análisis Real y Complejo
Cartagena, 26-28 de mayo de 2022

SEMIGROUPS OF COMPOSITION OPERATORS IN HARDY SPACES OF DIRICHLET SERIES

MANUEL D. CONTRERAS, CARLOS GÓMEZ-CABELLO,
AND LUIS RODRÍGUEZ-PIAZZA

Abstract. In this talk, we shall consider continuous semigroups of analytic functions $\{\Phi_t\}_{t\geq 0}$ in the so-called *Gordon-Hedenmalm class* $\mathcal{G}$, that is, the family of analytic functions $\Phi : \mathbb{C}_+ \to \mathbb{C}_+$ giving rise to bounded composition operators in the Hardy space of Dirichlet series $\mathcal{H}^2$. We will show the existence of a one-to-one correspondence between continuous semigroups $\{\Phi_t\}_{t\geq 0}$ in the class $\mathcal{G}$ and strongly continuous semigroups of composition operators $\{T_t\}_{t\geq 0}$, where $T_t(f) = f \circ \Phi_t$, $f \in \mathcal{H}^2$. Then, we will characterise the infinitesimal generators of continuous semigroups in the class $\mathcal{G}$ as the Dirichlet series sending $\mathbb{C}_+$ into its closure. For the case $p = \infty$, we shall prove that there are no non-trivial strongly continuous semigroups of composition operators in $\mathcal{H}^\infty$. Eventually, we will extend these results to the range $p \in [1, \infty)$.

Departamento de Matemática Aplicada II and IMUS, Escuela Técnica Superior de Ingeniería, Universidad de Sevilla, Camino de los Descubrimientos, s/n 41092, Sevilla, Spain
E-mail address: contreras@us.es

Departamento de Matemática Aplicada II and IMUS, Edificio Celestino Mutis, Avda. Reina Mercedes, s/n. 41012 - Sevilla, Universidad de Sevilla, Sevilla, Spain
E-mail address: cgcabello@us.es

Departmento de Análisis Matemático and IMUS, Facultad de Matemáticas, Universidad de Sevilla, Calle Tarfia, s/n 41012 Sevilla, Spain
E-mail address: piazza@us.es