



# Colloquium del Departamento de Análisis Matemático

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**“Rigidity of composition operators on Hardy  
spaces  $H^p$ ”**

**Jueves 19 de noviembre de 2015  
a las 13:00 horas en el seminario 222**

## **Abstract:**

I will discuss some structural rigidity properties related to the strict singularity of the composition operators  $f \mapsto C\phi(f) = f \circ \phi$  on the Hardy spaces  $H^p$  for  $p \neq 2$ , where  $\phi : D \rightarrow D$  is a given analytic map and  $D$  is the open unit disk in  $\mathbb{C}$ . In particular, I will outline the background and the proof of the following result about non-compact composition operators.

**Theorem.** Let  $1 \leq p < \infty$  and  $p \neq 2$ . Then for any  $\phi : D \rightarrow D$  either either

(1)  $C\phi$  is compact  $H^p \rightarrow H^p$ , or

(2) there is a subspace  $M \subset H^p$  such that  $M \approx \ell^p$ , the restriction  $C\phi|_M$  is an isomorphism  $M \rightarrow C\phi(M)$ , and  $C\phi(M) \subset H^p$  is complemented. (In other words,  $C\phi : H^p \rightarrow H^p$  is not an  $\ell^p$ -singular operator).

This is joint job with Jussi Laitila and Pekka Nieminen (Helsinki). The case  $p = 2$  is well-known general fact,  $p = 1$  follows from the work of Sarason (1992) and  $p = \infty$  is due to Bonet, Domanski and Lindström (1999).

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