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Barcelona Analysis Seminar **2023–2024**

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Optimal domain for T_g integral operator

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It is well-known that the integral operator T_g is bounded in $H^p(\mathbb{D})$ if $1 \leq p < \infty$ when $g \in \text{BMOA}$, see [2]. Nevertheless, it is possible that even for a function $f \in \text{Hol}(\mathbb{D}) \setminus H^p(\mathbb{D})$, $T_g(f)$ still belongs to $H^p(\mathbb{D})$. In [1] Curbera and Ricker introduced the optimal domain for the Cesáro operator, defined as

$$[C, H^p] := \{f \in \text{Hol}(\mathbb{D}) \text{ such that } \|C(f)\|_{H^p} < +\infty\}.$$

Based on the deep connection between the Cesáro operator and the integral operator T_g, in this talk we define the optimal domain for T_g when $g \in \text{BMOA}$

$$[T_g, H^p] := \{f \in \text{Hol}(\mathbb{D}) \text{ such that } \ T_g(f) \in H^p(\mathbb{D})\}.$$

We describe also some properties of the space $[T_g, H^p]$:

- It is a Banach space which strictly contains $H^p(\mathbb{D})$.
- $[T_g, H^{p_2}] \subsetneqq [T_g, H^{p_1}]$ for $1 < p_1 < p_2 < +\infty$.
- The space of multipliers $\mathcal{M}([T_g, H^p]) = H^\infty(\mathbb{D})$ and $[T_g, H^p]$ is never conformally invariant.

This talk is based on a joint work with the members of the research group at the Aristotle University of Thessaloniki.

References

[1] G. P. Curbera and W. J. Ricker. *Extension of the classical Cesáro operator on Hardy spaces.* Mathematica Scandinavica, 108(2):279-290, 2011.

[2] A. Aleman and A. G. Siskakis. *An integral operator on H^p.* Complex Variables, Theory and Application: An International Journal, 28(2):149-158, 1995.

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