

# SELF-IMPROVING BEHAVIOUR OF INNER FUNCTIONS AS MULTIPLIERS

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ABSTRACT. If  $X \subset Y$  are two classes of analytic functions in the unit disk  $\mathbb{D}$  and  $\theta$  is an inner function,  $\theta$  is said to be  $(X, Y)$ -*improving*, if every function  $f \in X$  satisfying  $f\theta \in Y$  must actually satisfy  $f\theta \in X$ . This notion has been recently introduced by K. M. Dyakonov.

In this paper we study the  $(X, Y)$ -*improving* inner functions for several pairs of spaces  $(X, Y)$ . In particular, we prove that for any  $p \in (0, 1)$  the  $(Q_p, BMOA)$ -improving inner functions and the  $(Q_p, \mathcal{B})$ -improving inner functions are precisely the inner functions which belong to the space  $Q_p$ . Here,  $\mathcal{B}$  is the Bloch space.

We also improve some results of Dyakonov on the subject regarding Lipschitz spaces and Besov spaces.

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