TOEPLITZ AND HANKEL OPERATORS ACTING BETWEEN DISTINCT HARDY SPACES

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Classical Toeplitz T_a and Hankel H_a operators on Hardy space H^2 are defined by

$$T_a : f \mapsto P(af) \text{ and } H_a : f \mapsto P(aJf),$$

where P is the Riesz projection, J is the flip operator and the function $a \in L^\infty$ is called the symbol of T_a and H_a, respectively. Theory of such operators acting on H^p spaces, as well as a number of another kind of spaces is very well developed and still widely investigated. However, in this investigations operators are mainly considered to act from one to the same space. Our goal is to present a background for such operators acting between distinct Hardy spaces, i.e. $T_a, H_a : H[X] \to H[Y]$, where X, Y are rearrangement invariant spaces and symbols a are allowed to be unbounded functions from the space of pointwise multipliers $M(X, Y)$. We will present analogues of Brown-Halmos and Nehari theorems for such Toeplitz and Hankel operators, respectively.