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COMPOSITION OPERATORS ON SOME F-ALGEBRAS OF HOLOMORPHIC FUNCTIONS

JUN SOO CHOA AND HONG OH KIM

ABSTRACT. We let N^p, $p > 1$, be the $F-$algebra of holomorphic functions f on the unit disc $\mathbb{D}$ which satisfy

$$\lim_{r\nearrow 1}\int_0^{2\pi}\left(\log(1+|f(re^{i\theta})|^2)\right)^p d\theta < \infty.$$

In this paper we prove that the composition operator induced by a holomorphic self-map of the unit disc is compact on N^p, $p > 1$, if and only if it is compact on the Hardy space H^2.

1. INTRODUCTION

For $p \geq 1$, we let N^p denote the class of all functions f holomorphic in the unit disc $\mathbb{D}$ which satisfy the growth condition

$$\lim_{r\nearrow 1}\int_0^{2\pi}(\log^+|f(re^{i\theta})|)^p d\theta < \infty.$$

If $p \geq 1$, the inequalities

$$(1)\qquad (\log^+ x)^p \leq \left(\log(1+x^2)\right)^p \leq 2^{p-1}\left(1+(\log^+ x)^p\right) \quad \text{for all } x \geq 0$$

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