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A note on composition operators on Besov type spaces

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Abstract

Let $\mathbb{D}$ be the open unit disc in the complex plane $\mathbb{C}$. We denote by $H(\mathbb{D})$ the space of all holomorphic function on $\mathbb{D}$. given a holomorphic self map φ on $\mathbb{D}$ the composition operator C_φ on $H(\mathbb{D})$ is defined by

$$(C_\varphi f)(z) = f(\varphi(z))$$

for every $f \in H(\mathbb{D})$ and $z \in \mathbb{D}$.

In this article we give some results about the boundednes of the composition operators on Besov type space $B_{p,q}$ for $1 < p < \infty$ and $-1 < q < \infty$.

Keywords: Composition operator, Carleson Measure, Besov Type Space
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1 Introduction

Let $\mathbb{D}$ be the open unit disc in the complex plane $\mathbb{C}$. We will use the notation $H(\mathbb{D})$ to denote the space of holomorphic functions on the unit disc $\mathbb{D}$. Suppose φ is a holomorphic function defined on $\mathbb{D}$ such that $\varphi(\mathbb{D}) \subseteq \mathbb{D}$. Each $\psi \in H(\mathbb{D})$ and holomorphic self-map φ of $\mathbb{D}$ induces a linear weighted composition operator $C_{\psi,\varphi} : H(\mathbb{D}) \to H(\mathbb{D})$ defined by

$$C_{\psi,\varphi}(f)(z) = \psi(z)f(\varphi(z))$$

for every $f \in H(\mathbb{D})$ and $z \in \mathbb{D}$.

(weighted) Composition operator on various spaces of functions are being studied by many authors. We can refer for example to [4, 5, 6, 7].

Fix any $a \in \mathbb{D}$ and let $\sigma_a(z)$ be the Mobius transform defined by

$$\sigma_a(z) = \frac{a - z}{1 - \overline{a}z}, z \in \mathbb{D}.$$

We denote the set of all Mobius transformations on $\mathbb{D}$ by G. Such a map is its own inverse and satisfies the fundamental identity

$$|\sigma_a'(z)| = \frac{1 - |a|^2}{|1 - \overline{a}z|^2}.$$

see[6, 9].

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