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RESULTS ON DYNAMICS OF BUNGEE SET OF COMPOSITE ENTIRE FUNCTIONS IN THE EREMENKO-LYUBICH CLASS

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Abstract. In this paper, we have discussed the dynamics of composite entire functions in terms of relationship between bungee set, escaping set and filled-in Julia set. We have established some relation between the dynamics of composition of entire functions and the functions taken for composition. We have shown that for commuting functions satisfying **Property A**, the intersection of the bungee set of two entire functions contains the bungee set of the composite function. In addition, it is shown that for commuting entire functions satisfying **Property A**, the filled-in Julia set of composite entire functions contains the filled-in Julia set of functions used for the composition. The results have been illustrated with several examples. We have mostly dealt with permutable(commuting) functions.

1. Introduction

When we iterate a holomorphic function $f : \mathbb{C} \to \mathbb{C}$, $n-$times, we observe that the points of the complex plane move differently, which we call the dynamics of the point. Here, f^n denotes the $n-$th iteration of function f, where $n \in \mathbb{N}$. As, not all points have same dynamics, we therefore have different classifications of points of the complex plane $\mathbb{C}$; one classification is based on the nature of neighbourhood of a point z_0 (say); they are said to be in the Fatou set $F(f)$ (set of points whose neighbourhood exhibits stable behaviour) and Julia set $J(f)$ (set of points whose neighbourhood exhibits chaotic behaviour). This was broadly the classification we generally see when we talk about dynamics of points in the complex plane.

There is yet another classification of these points based on the nature of their orbits; viz., the filled-in Julia set $K(f)$ (set of points whose orbits are bounded), escaping set $I(f)$ (set of points whose orbits tend to infinity), and bungee set $BU(f)$ (the orbits of

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