

Some applications of approximation theory to complex dynamics

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Let f be a transcendental entire function. For $n \in \mathbb{N}$, let f^n denote the n^{th} iterate of f . The set $F(f) = \{z \in \mathbb{C} : (f^n)_{n \in \mathbb{N}} \text{ is normal in some neighbourhood of } z\}$ is called the Fatou set of f , and the set $\mathbb{C} \setminus F(f)$ denoted by $J(f)$ is called the Julia set of f .

Let U be a component of $F(f)$, then by complete invariance of the Fatou set, $f(U)$ lies in some component V of $F(f)$. If $U_n \cap U_m = \emptyset$ for $n \neq m$, where U_n denotes the component of $F(f)$ which contains $f^n(U)$, then U is called a wandering domain, else U is called a pre-periodic domain, and if $U_n = U$ for some $n \in \mathbb{N}$, then U is called periodic domain.

Here we present some of the results that we have obtained on the wandering and periodic domains using approximation theory.