

Buried Points in Julia Sets

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The *residual Julia set* of a complex analytic function (rational, entire, or meromorphic) is defined as its Julia set minus the boundaries of its Fatou components. The residual Julia set is also called the set of *buried points*. It is not hard to see that, when a component of the Fatou set is fully invariant under some power of a rational map, as with the basin of attraction of infinity for a polynomial, the residual Julia set is empty. Among connected Julia sets, there are cases, for example, in the family $z \mapsto z^n + \frac{\lambda}{z^d}$, with $n, d \geq 3$, where the residual Julia set is homeomorphic to the irrational numbers, and others where it is homeomorphic to the “irrational” points of the Sierpinski universal plane curve (Sierpinski carpet). We will discuss open questions, both topological and dynamical, concerning residual Julia sets, and recent progress in answering some of them. One particular question of interest: Under what conditions is the set of buried points homeomorphic to the irrational numbers?