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Fractals arising from Newton's method

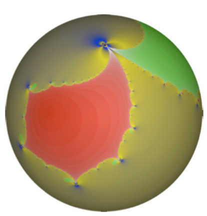
Abstract. The aim of this talk is to introduce the concept of fractals arising from Newton's method. We consider the dynamics as a special class of rational functions that are obtained from Newton's method when applied to a polynomial equation. Finding solutions of these equations leads to some beautiful images in complex functions. These images represent the basins of attraction of roots of complex functions. If z_0 is an attracting periodic point of some rational function of degree larger that one, its basin of attraction is as follows:

$$\mathcal{B}(z_0) := \{z \in \mathbb{C}\ |{N_f}^n(z_0) \text{ converges to } z_0,\ n \to \infty\}.$$

The basin of attraction $\mathcal{B}(z_0)$ is a union of components of the Fatou set, and the boundary of $\mathcal{B}(z_0)$ coincides with the Julia sets of a rational function N_f. In this presentation, we seek will the answer of the following question:

"What is the dynamics near the chosen parabolic fixed points?"

For example,



$f(z) = (z^2+4)e^z$ the Newton function of f is $N_f(z) = \frac{z^3+z^2+4z-z}{z^2+2z+4}$ and the fractal image of that function on Riemann sphere is presented.

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