

A MANDELBROT-SIERPINSKI SPIRAL FOR RATIONAL MAPS OF THE FORM $z^n + \lambda/z^d$

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In this paper we identify a new type of structure that lies in the parameter plane of the family of maps $F(z) = z^n + \lambda / z^d$ where $n \geq 4$ is even but $d \geq 3$ is odd. We call this structure a Mandelbrot-Sierpinski spiral. This spiral in the parameter plane consists of infinitely many arms of infinitely many alternating Mandelbrot sets and Sierpinski holes that extend from and terminate in successively smaller Sierpinski holes that converge to the unique parameter for which the critical value lands on a fixed point in the dynamical plane. This paper builds off "A Mandelbrot-Sierpinski Maze for Rational Maps of the Form $z^n + \lambda/z^d$ by Bob Devaney, and identifies that structure, the "Sierpindelbrot" arc, inside this version of the Rational Map as well.