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GENERATION OF FRACTALS AND ANTI-FRACTALS USING THAKUR ITERATIVE SCHEME

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Abstract. In this paper, we exhibit utilization of fixed point iterative techniques towards generating fractals (Mandelbrot and Julia sets) and anti-fractals (tricorns, multicorns and anti-Julia sets) for the complex polynomials $P(z) = z^k + c$ and antipolynomials $A(z) = \bar{z}^d + c$ respectively, where c is complex number and $k, d \geq 2$. We find escape criteria to generate fractals and anti-fractals. Moreover, we graphically envisage and perceive the dynamics of these fractals and anti-fractals. Several attractive aesthetic shapes have been obtained which explore the geometry of fractals and anti-fractals.

1. Introduction

A fractal is a geometric graphics which follows the similar pattern at different scales [7]. French mathematician Gaston Julia [6] gave a new direction to the fractal theory. In 1975, Mandelbrot broadened the idea of Julia and used the term fractal for the first time. He introduced Mandelbrot set by taking "c" as a boundary of the complex quadratic function $z^2 + c$ [19]. The Julia and Mandelbrot sets can be perceived as images of fractal arts and they are generated with the assistance of fractal creating programming because it provides phenomena calculative abilities [2, 9]. The word fractal is almost half-century-old and the field of fractals is additionally named as fractal geometry. Due to the progression of innovation and the expansion of existing cultural necessities, some authors tried to improve the idea of fractals by adding more complex features to the systems involved. Also, the dynamics of antipolynomial $\bar{z} \mapsto \bar{z}^d + c$ leads to interesting tricorns, multicorns and anti-Julia sets [7, 21].

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