Fractals introduction

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Disaitek
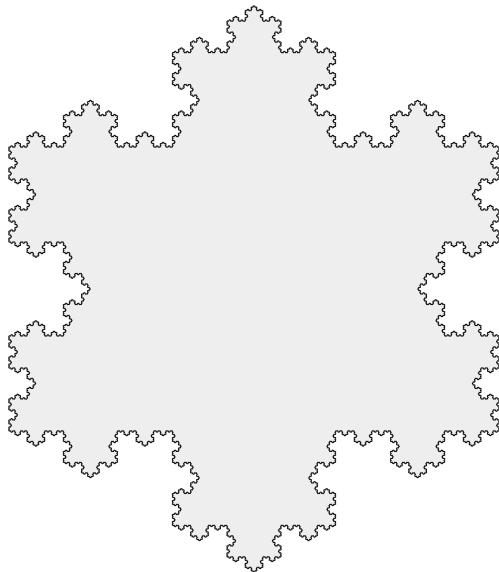Intel AI Software Innovator

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What are fractals?

Koch snowflake

Pythagora tree

Complex numbers and complex plane

$$c = ai + b$$
$$i^2 = -1$$

The *norm* of a complex number is its euclidiean distance to 0:

$$c = ai + b$$

Mandelbrot set

Function to iterate

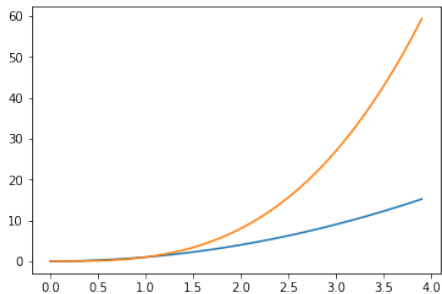The formula that generates everything is the following one:

$$z_0 = c$$
$$z_n = z_n^2 + c$$

For each pixel (x, y) of the screen, we compute the corresponding complex number $c_{x,y}$.

Now we compute a fixed number of terms of the sequence above starting with $z_0 = c_{x,y}$.

$$z_0 = c_{x,y}$$
$$z_1 = c_{x,y}^2 + c_{x,y}$$
$$z_2 = z_1^2 + c_{x,y} = (c_{x,y}^2 + c_{x,y})^2 + c_{x,y}$$
$$\cdots$$
$$z_{100} = z_{99}^2 + c_{x,y}$$

Function interpolation with Python

Mandelbrot set

mandelbrot image.