Appendix B: Fractal Terminology and Notation

Vocabulary:

A fractal is a never-ending pattern. Fractals are infinitely complex patterns that are self-similar across different scales. They are created by repeating a simple process over and over in an ongoing feedback loop. Driven by recursion, fractals are images of dynamic systems – the pictures of Chaos.

Equations used:

Complex Point:
Let $c = a + bi$
$I^2 = -1$

Formula $Z_{n+1} = Z_n^2 + c$
$Z_0 = 0$

The Modulus is the distance to the origin (much like the Pythagorean theorem for complex numbers):
$Z = x + yi$
$|z| = |x + yi| = \sqrt{(x^2 + y^2)}$

Let c = c_r + c_i

Let z = z_r + z_i

z' = z*z + c
= (z_r + z_i)(z_r + z_i) + c_r + c_i
= $z\_r^2 + 2*z\_r*z\_i - z\_i^2 + c\_r + c\_i$

$z\_r' = z\_r^2 - z\_i^2 + c\_r$
$z\_i' = 2*z\_i*z\_r + c\_i$