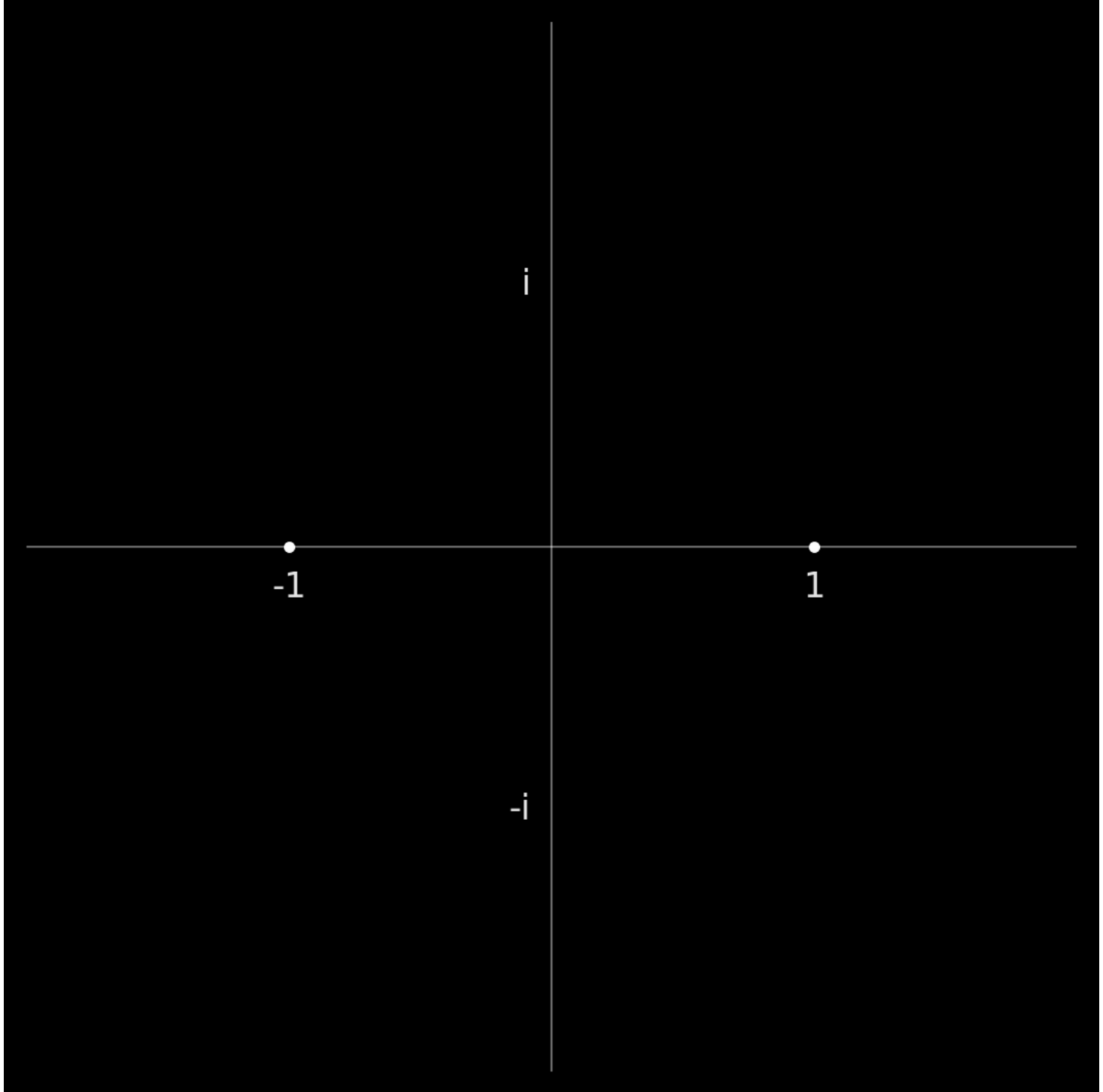
Littlewood Polynomial Roots

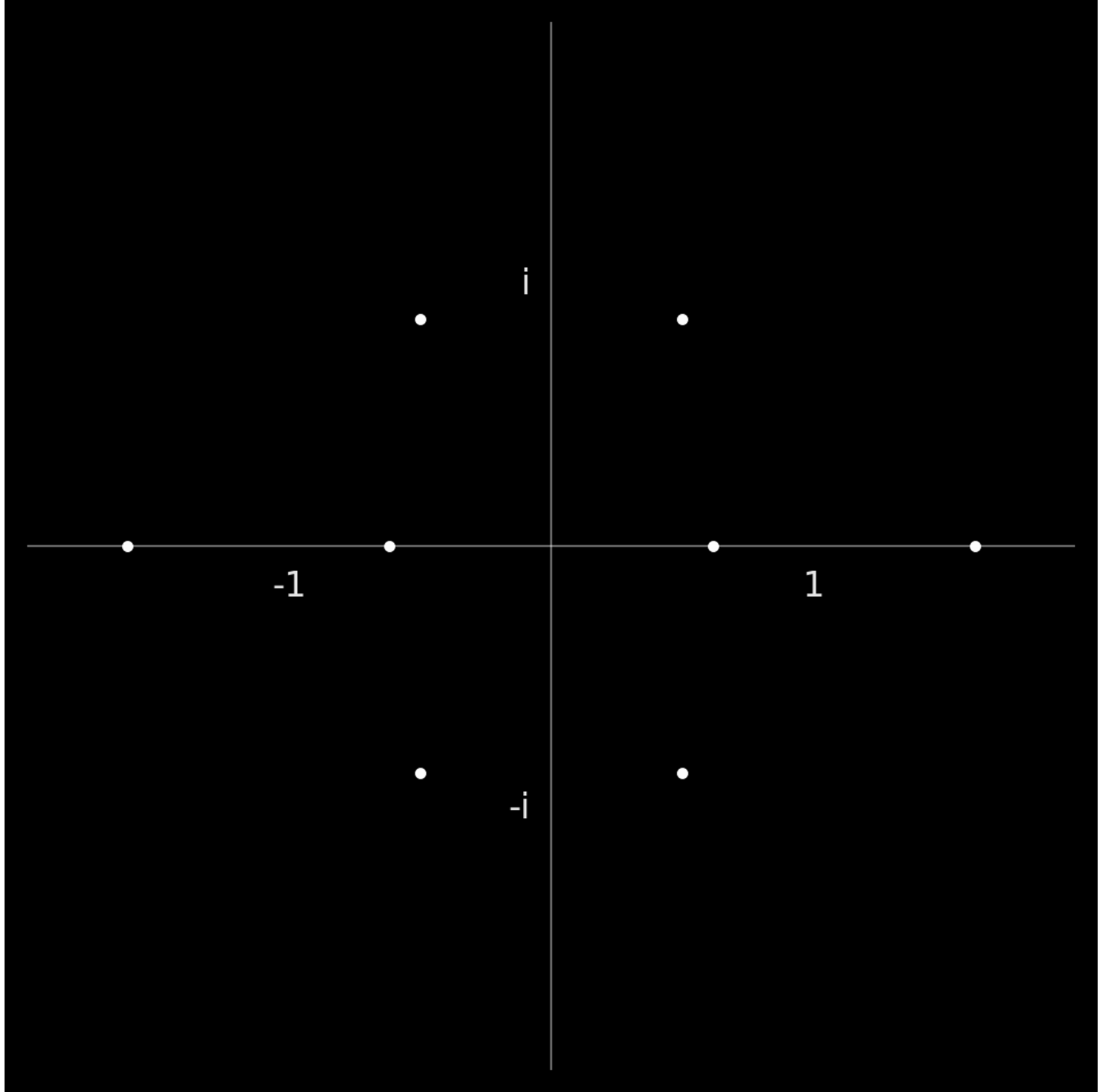
Math/Physics Colloquium 3/10/26

Tom Crawford



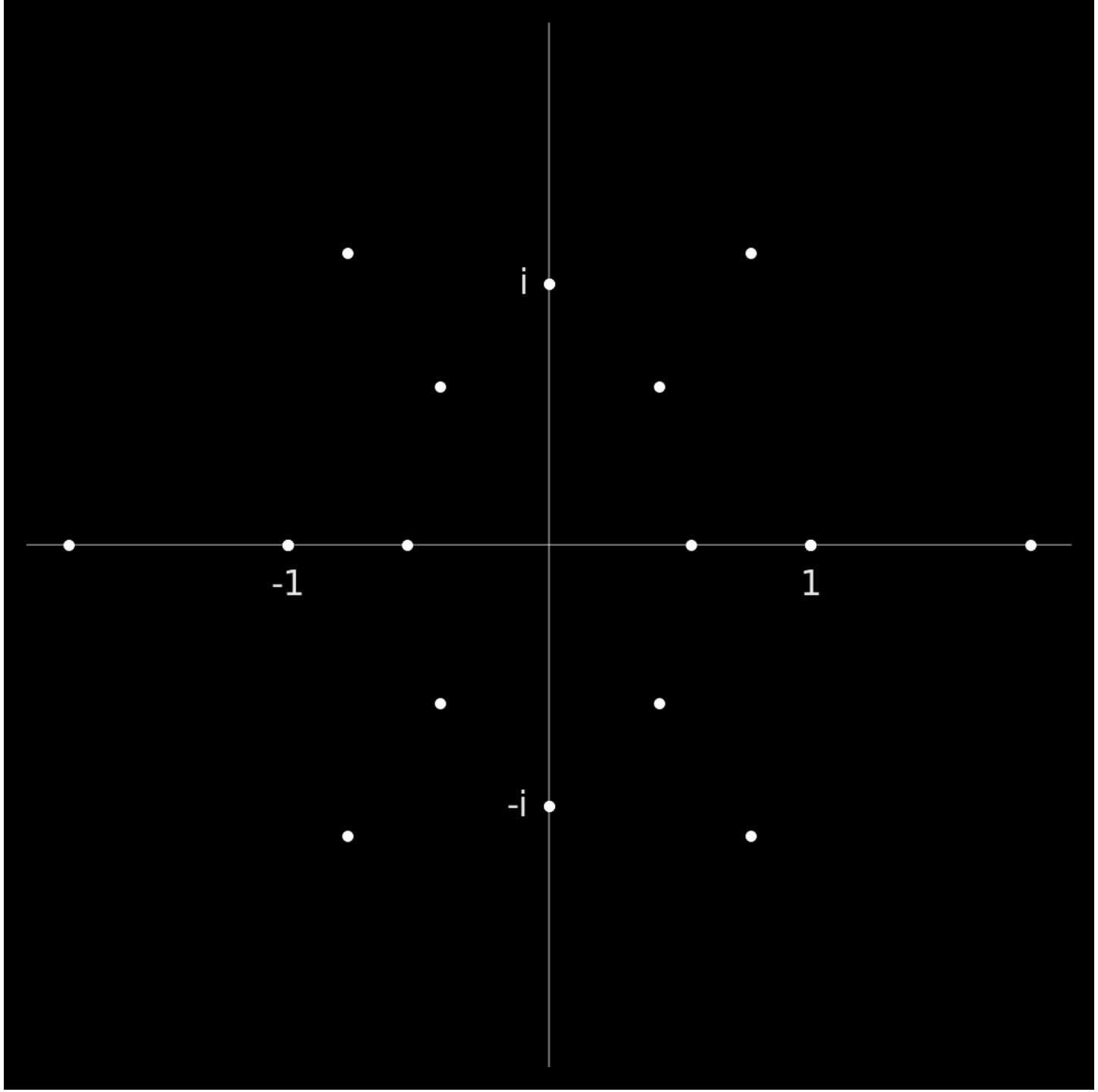
Degree 1

$\pm x \pm 1 = 0$



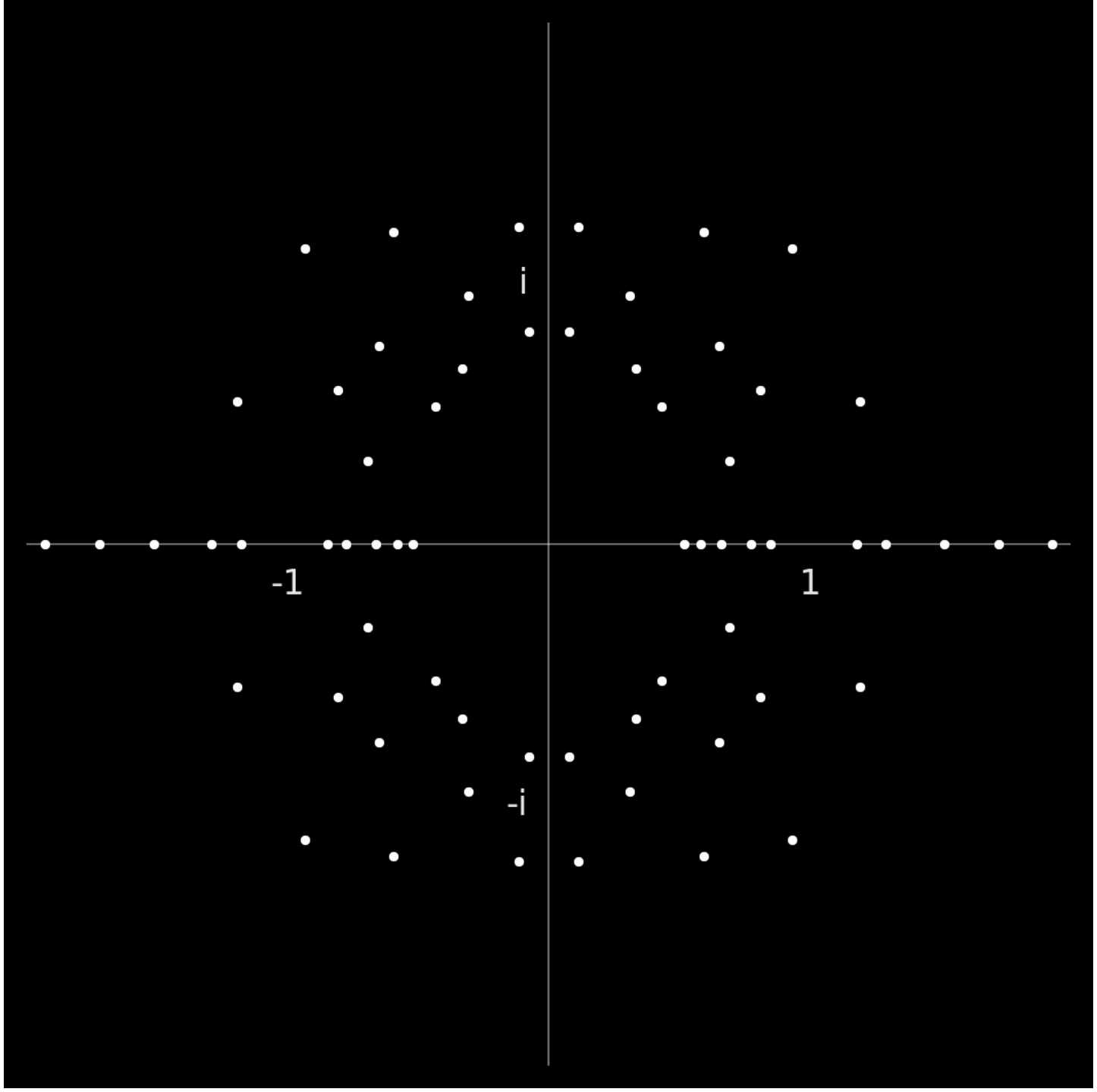
Degree 2

$$\pm x^2 \pm x \pm 1 = 0$$



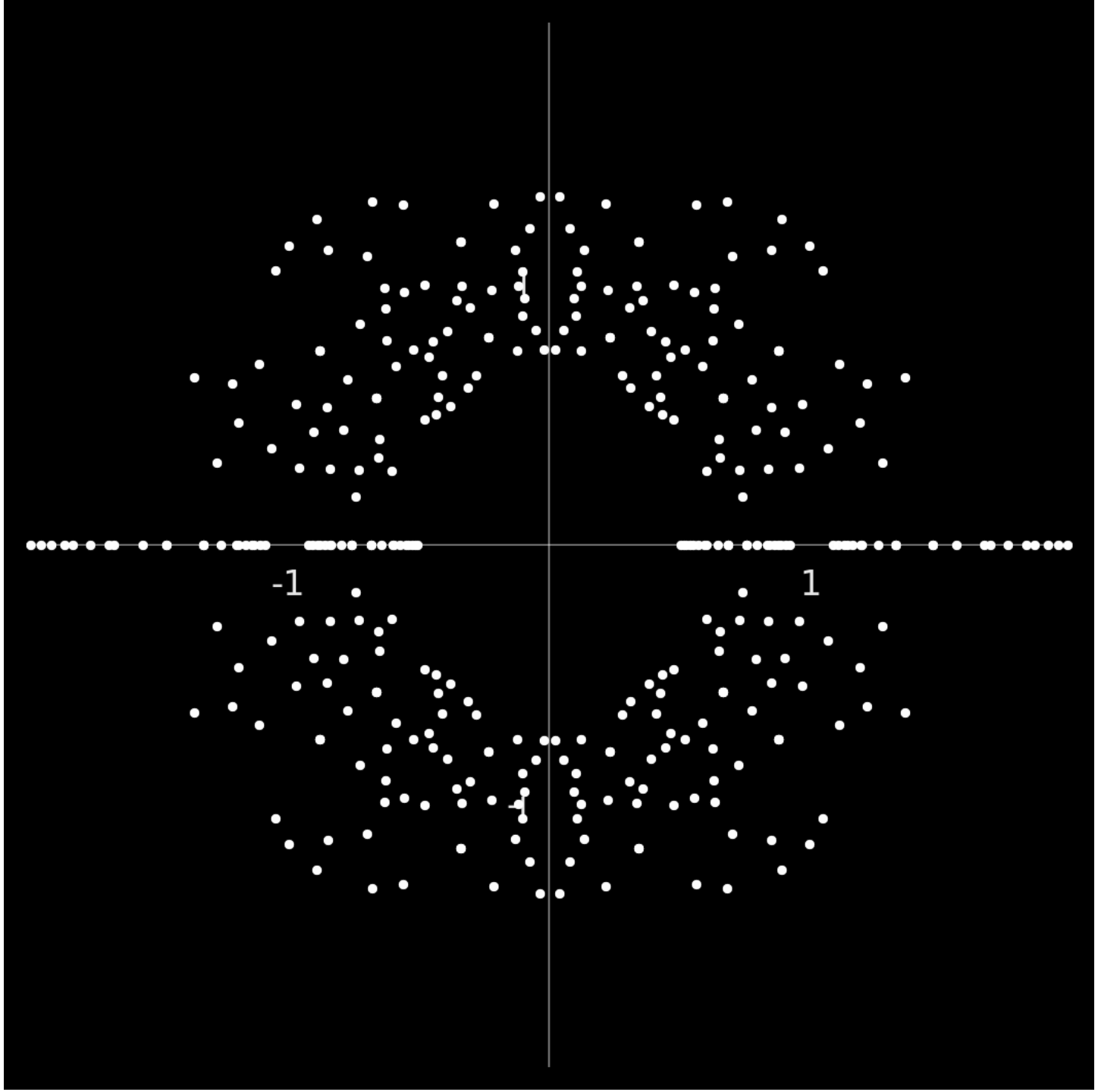
Degree 3

$$\pm x^3 \pm x^2 \pm x \pm 1 = 0$$

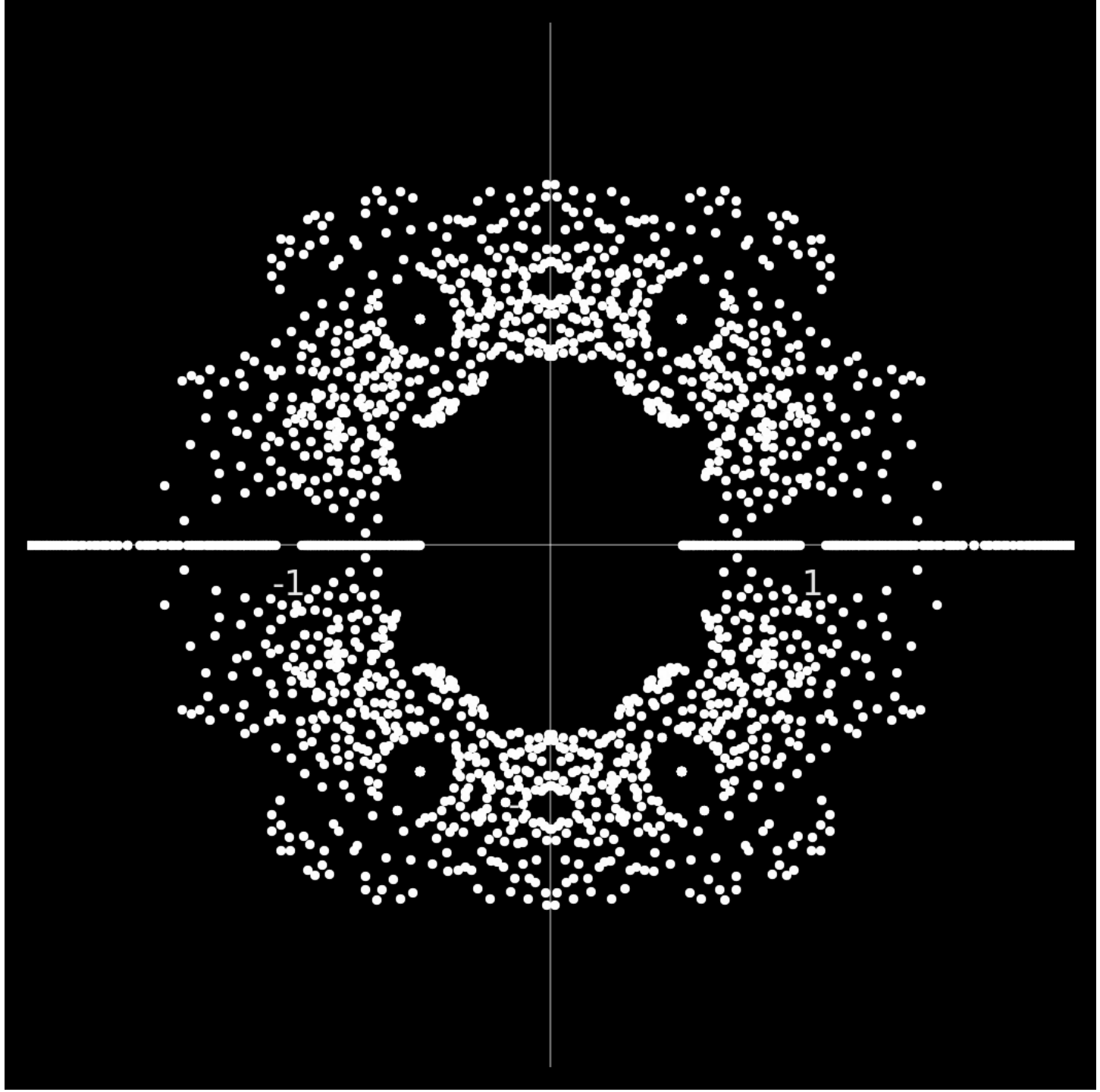


Degree 4

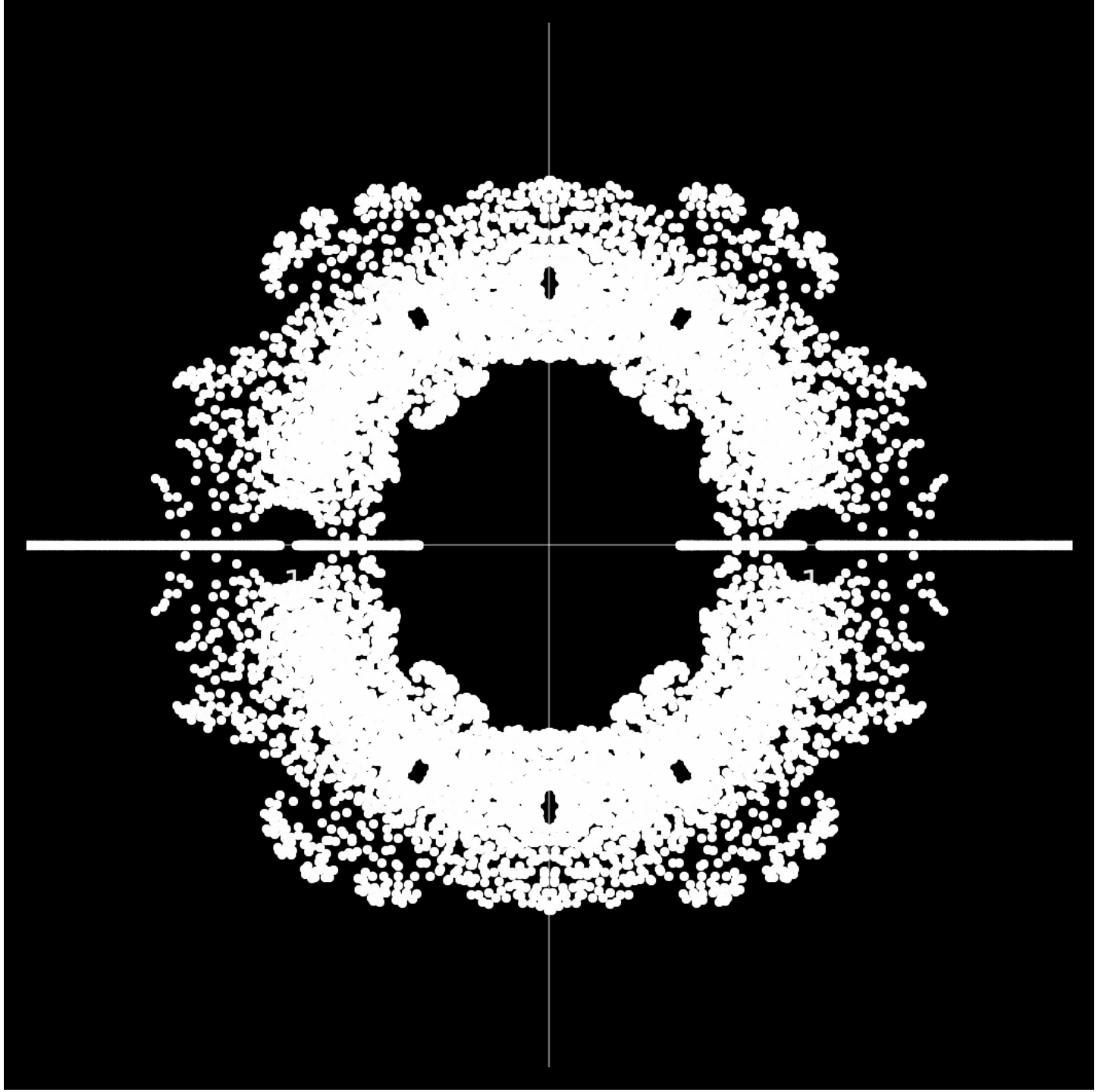
$$\pm x^4 \pm x^3 \pm x^2 \pm x \pm 1 = 0$$



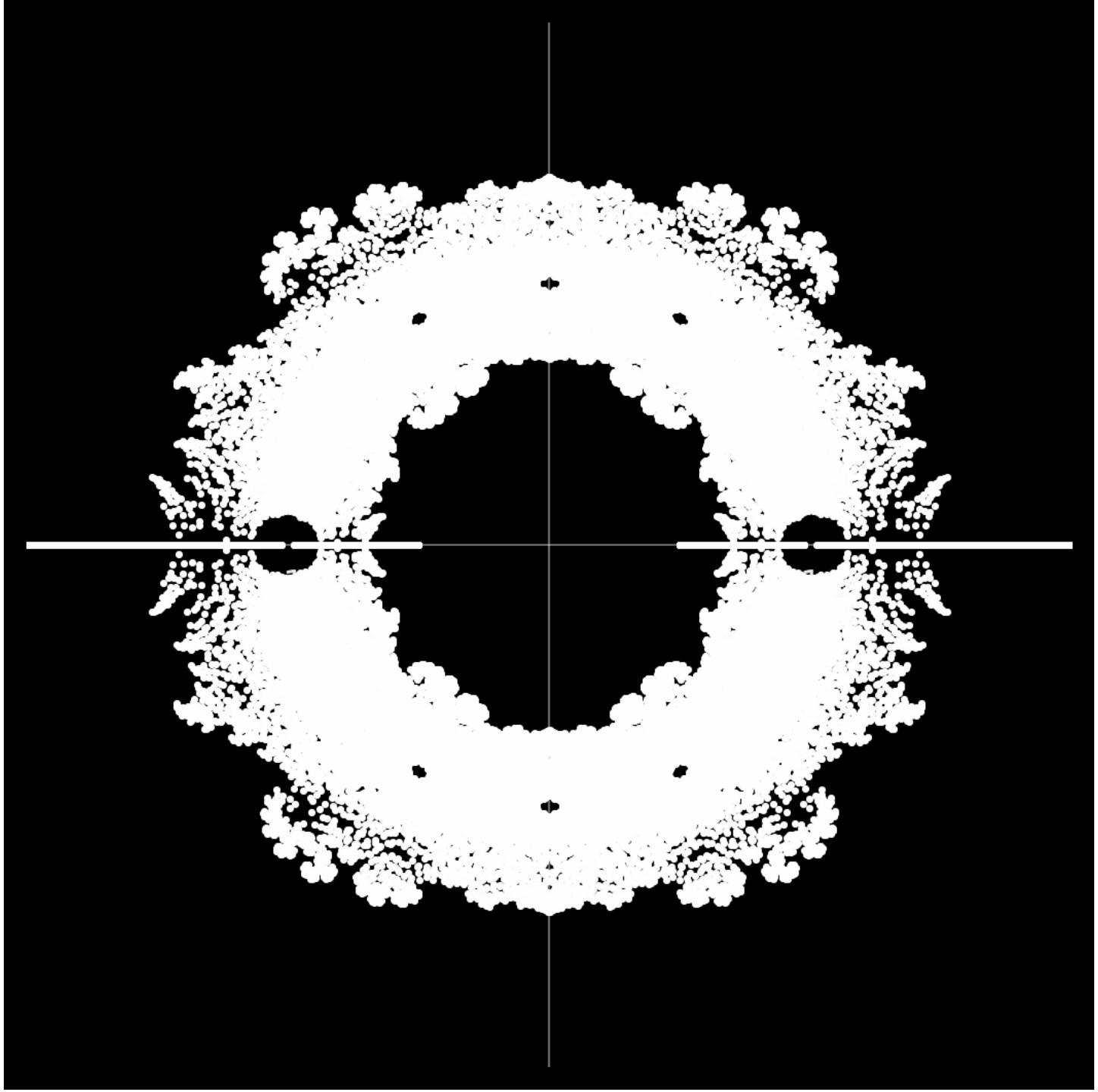
Degree 6



Degree 8

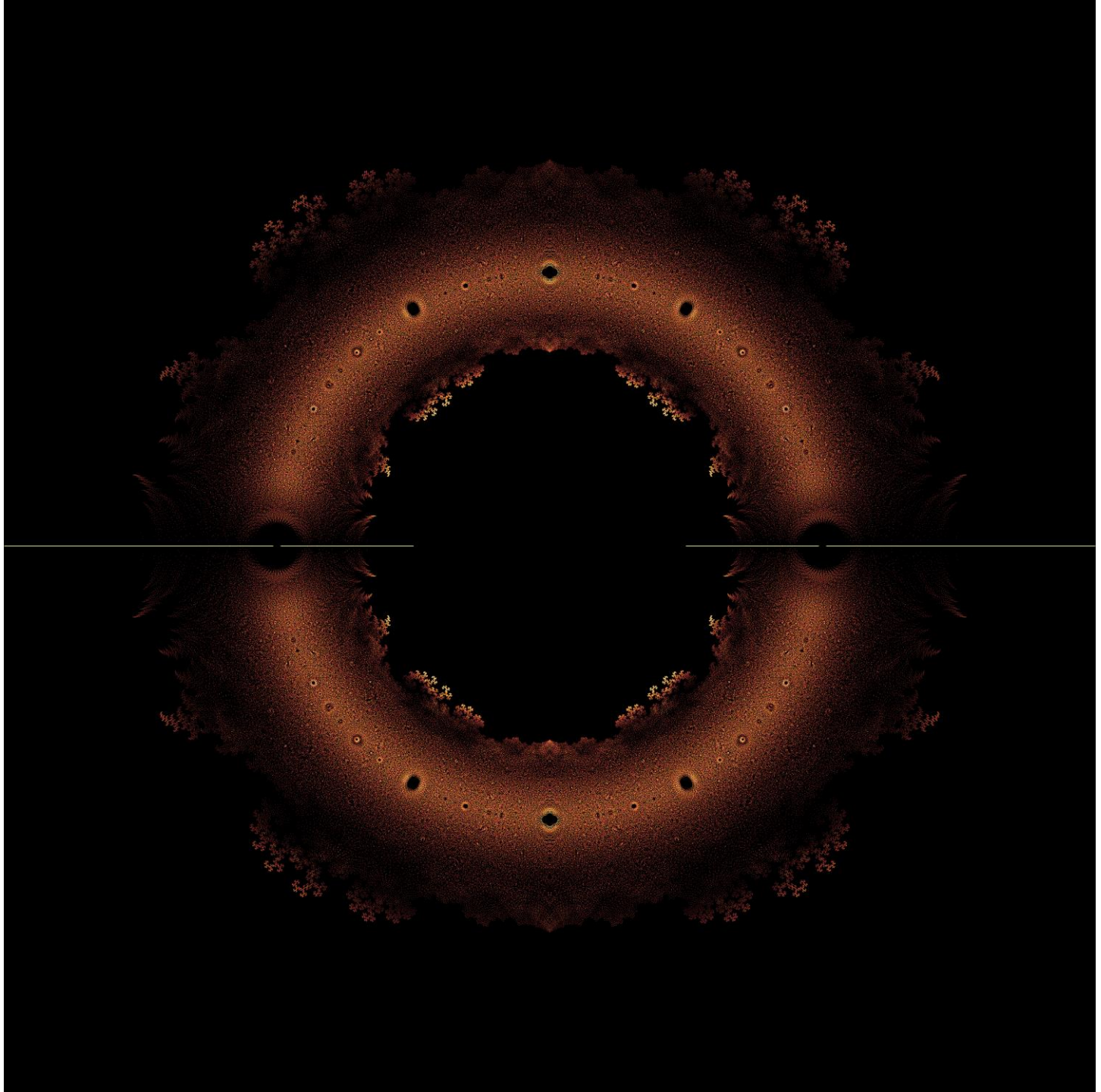


Degree 10

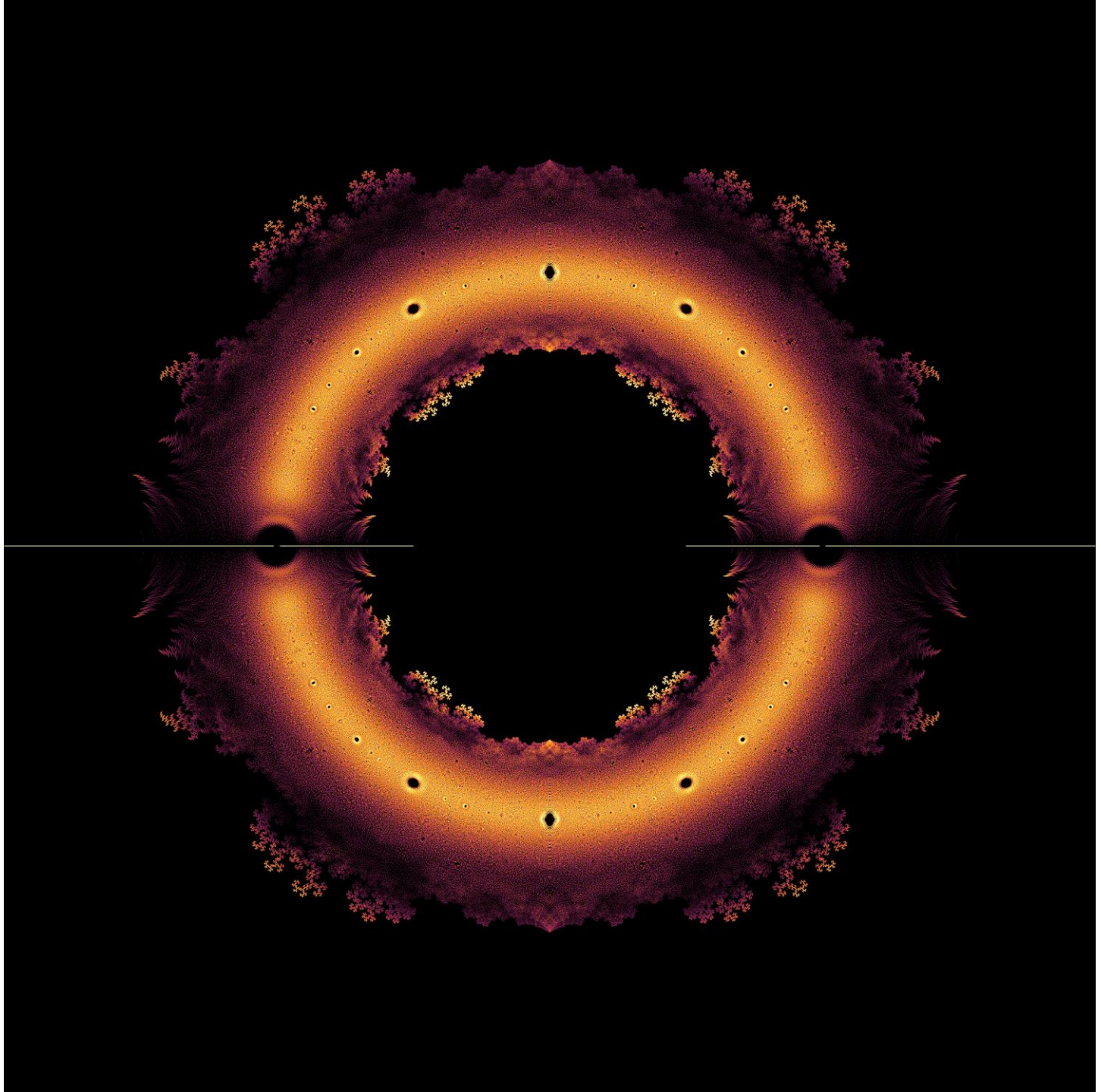


Degree 12

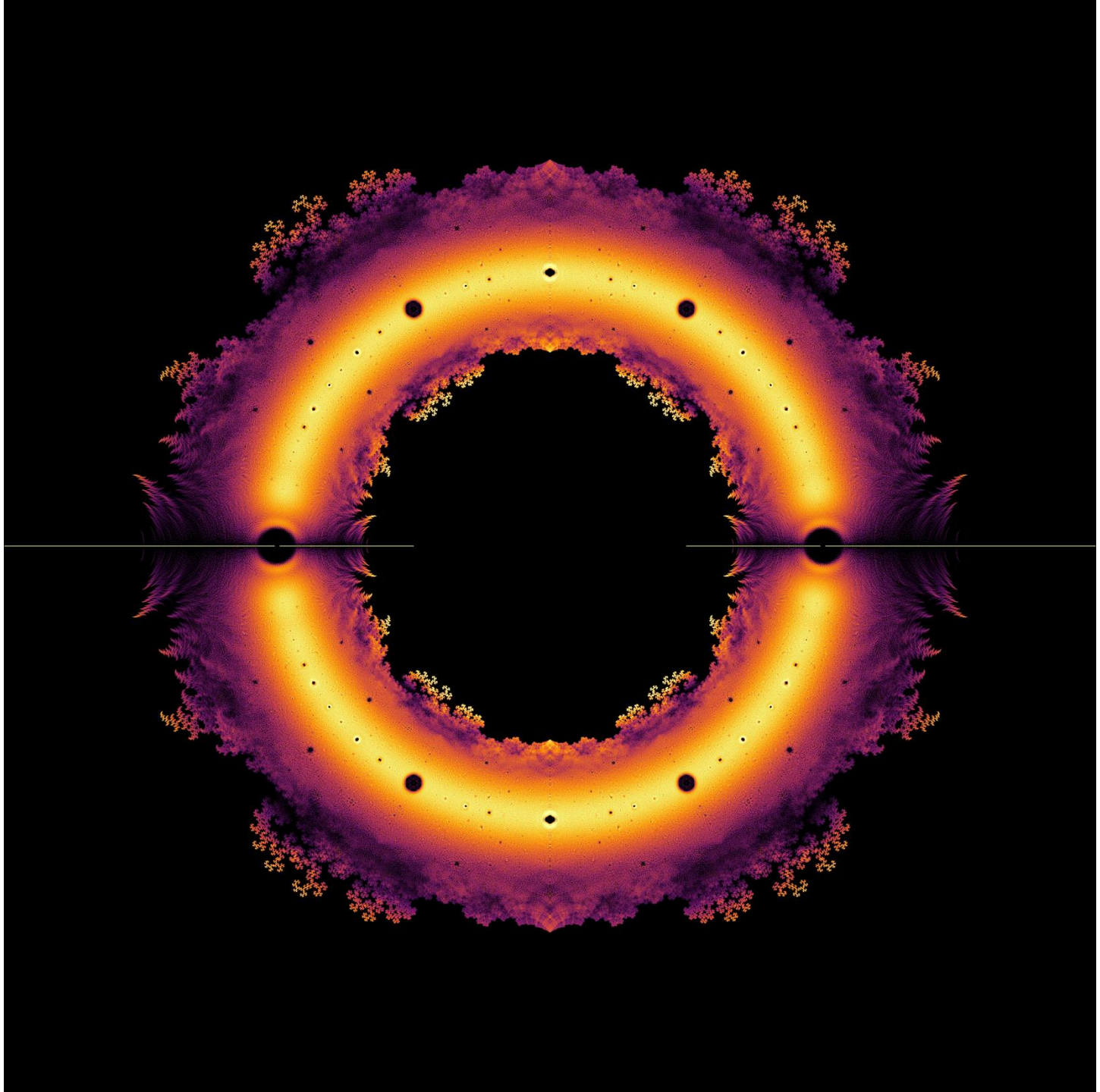
Degree 14



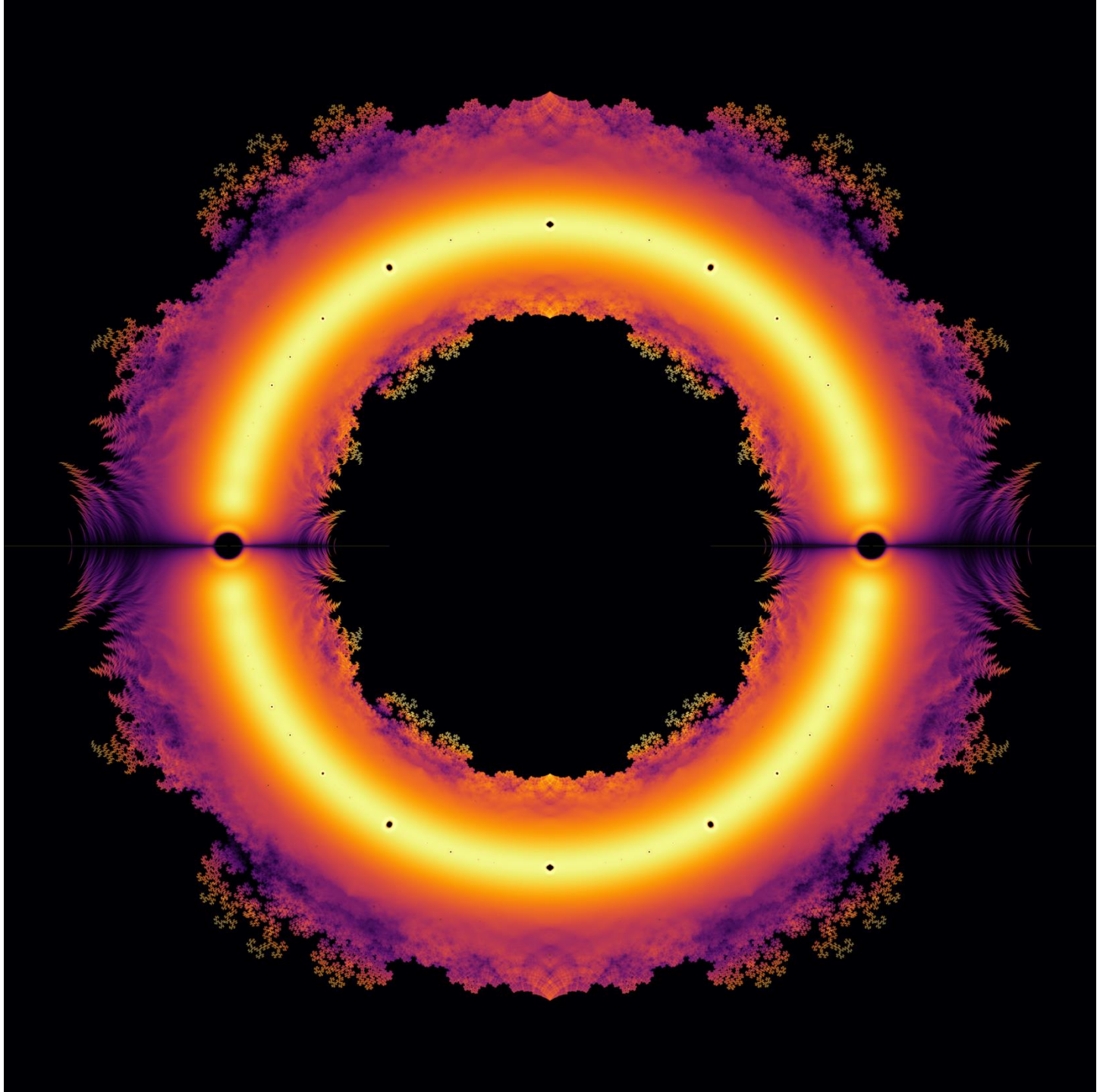
Degree 16



Degree 18



Degree 20



Degree 28

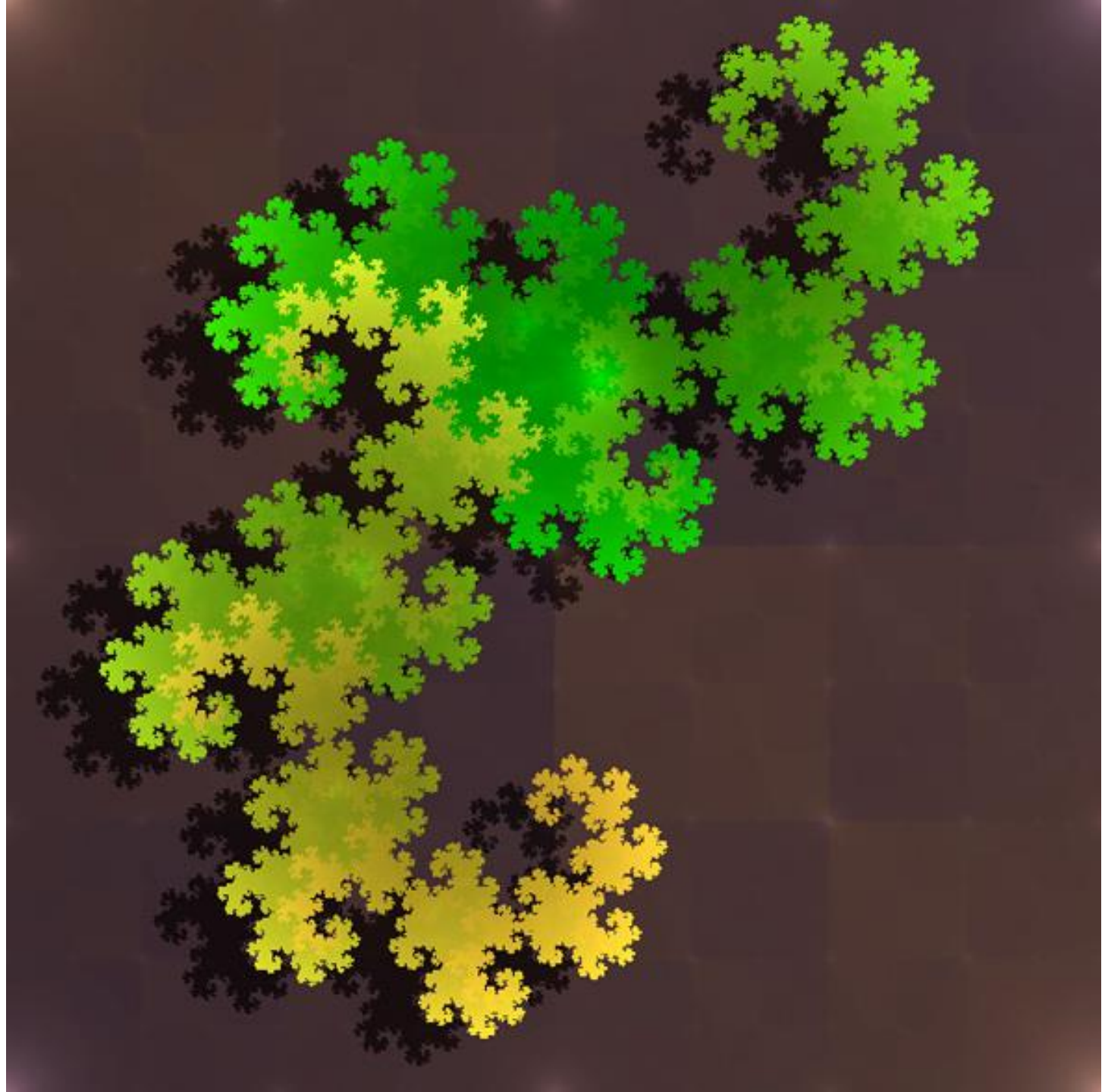
Heighway Dragon Fractal

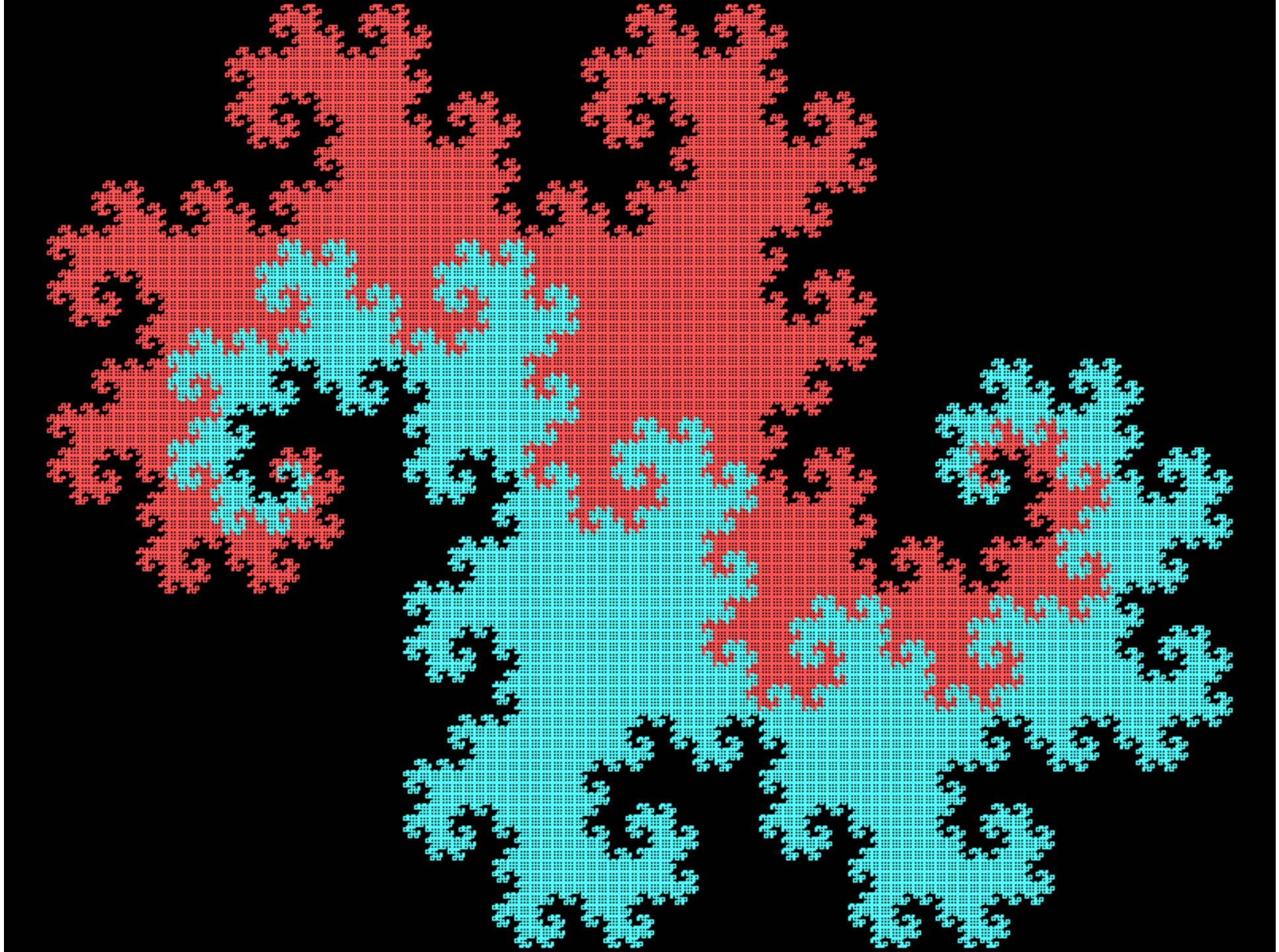
$$S_0 = \{0,1\}$$

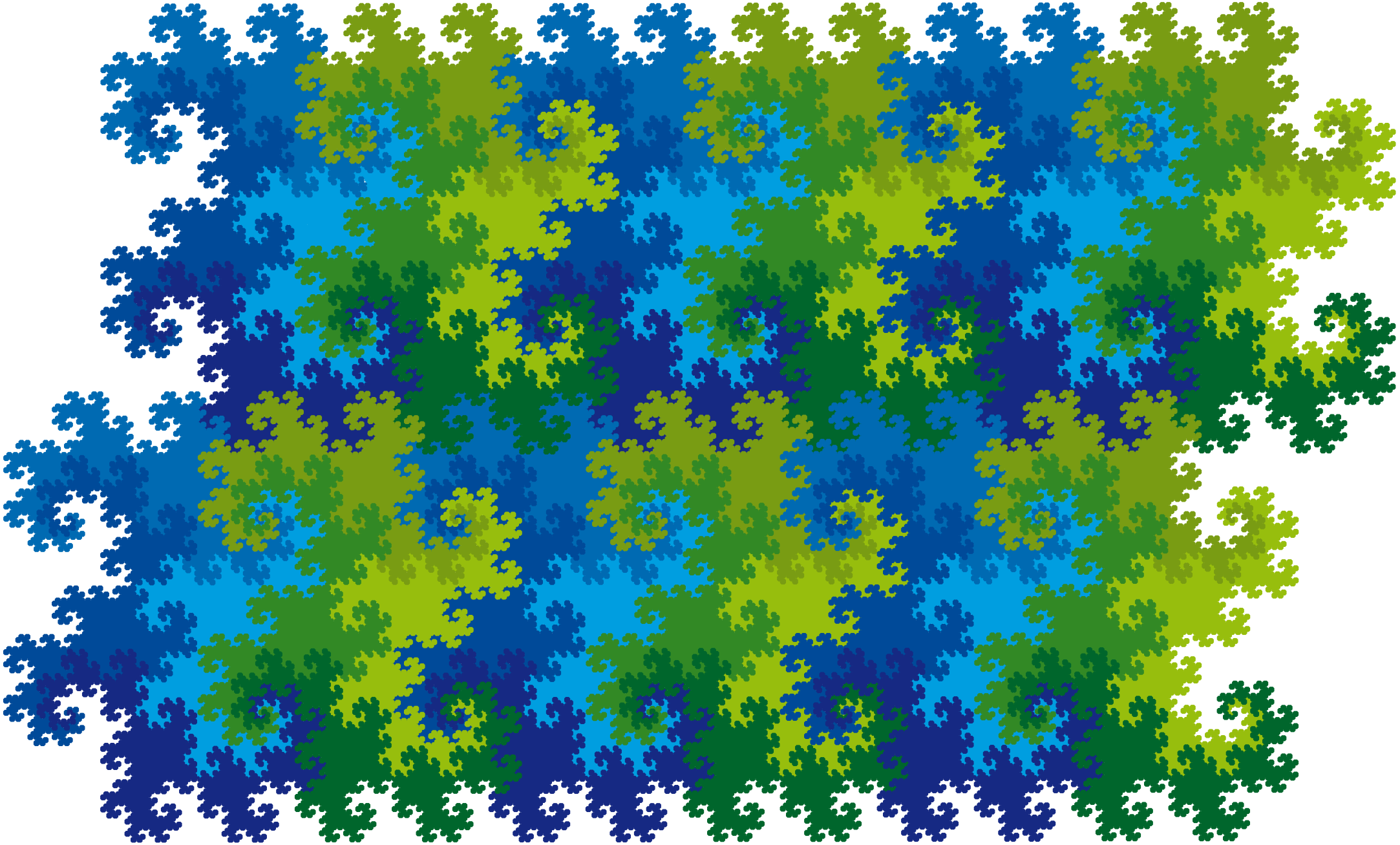
$$f_1(z) = \frac{(1+i)z}{2}$$

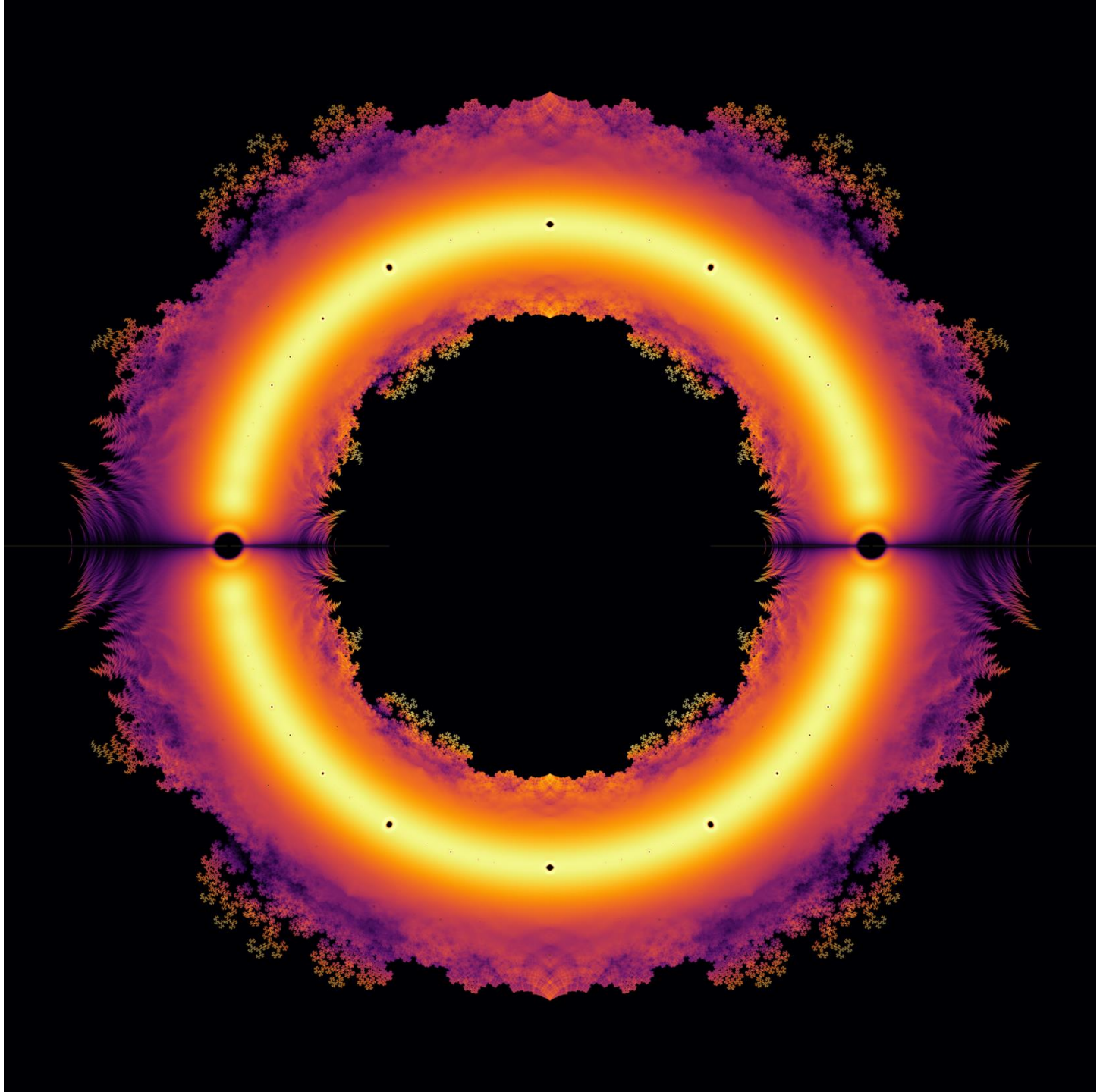
$$f_2(z) = 1 - \frac{(1-i)z}{2}$$

0

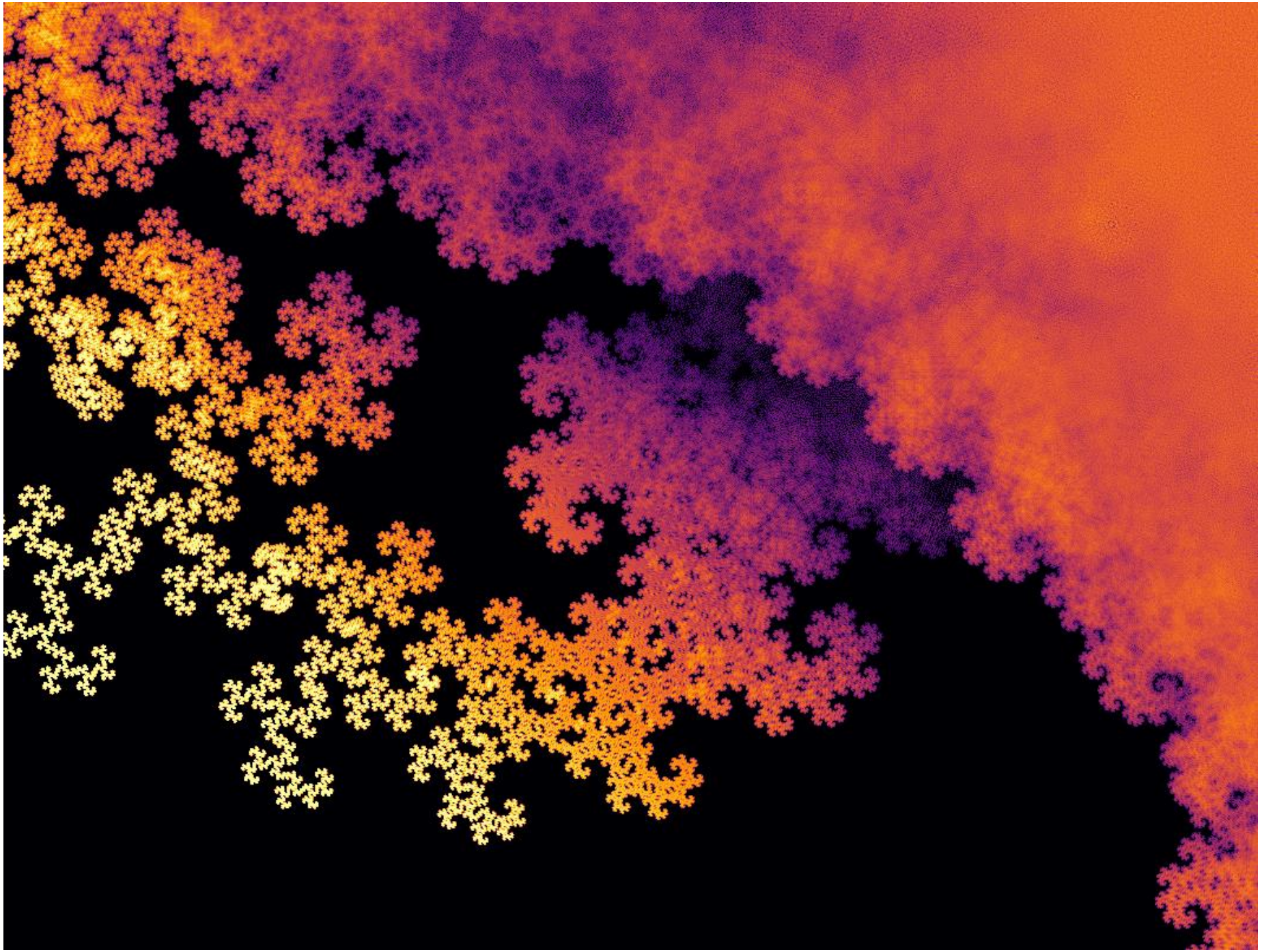




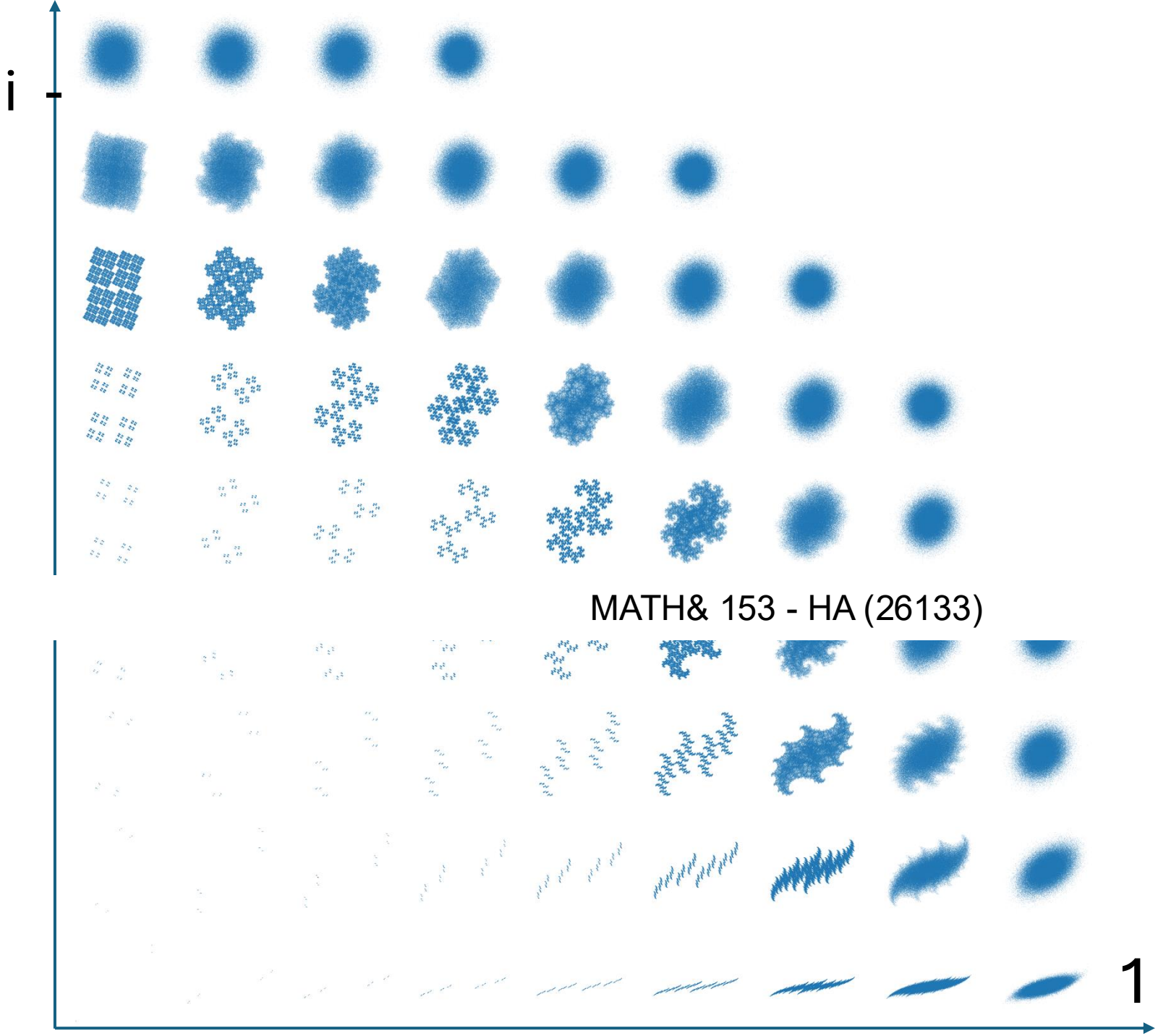




Degree 28

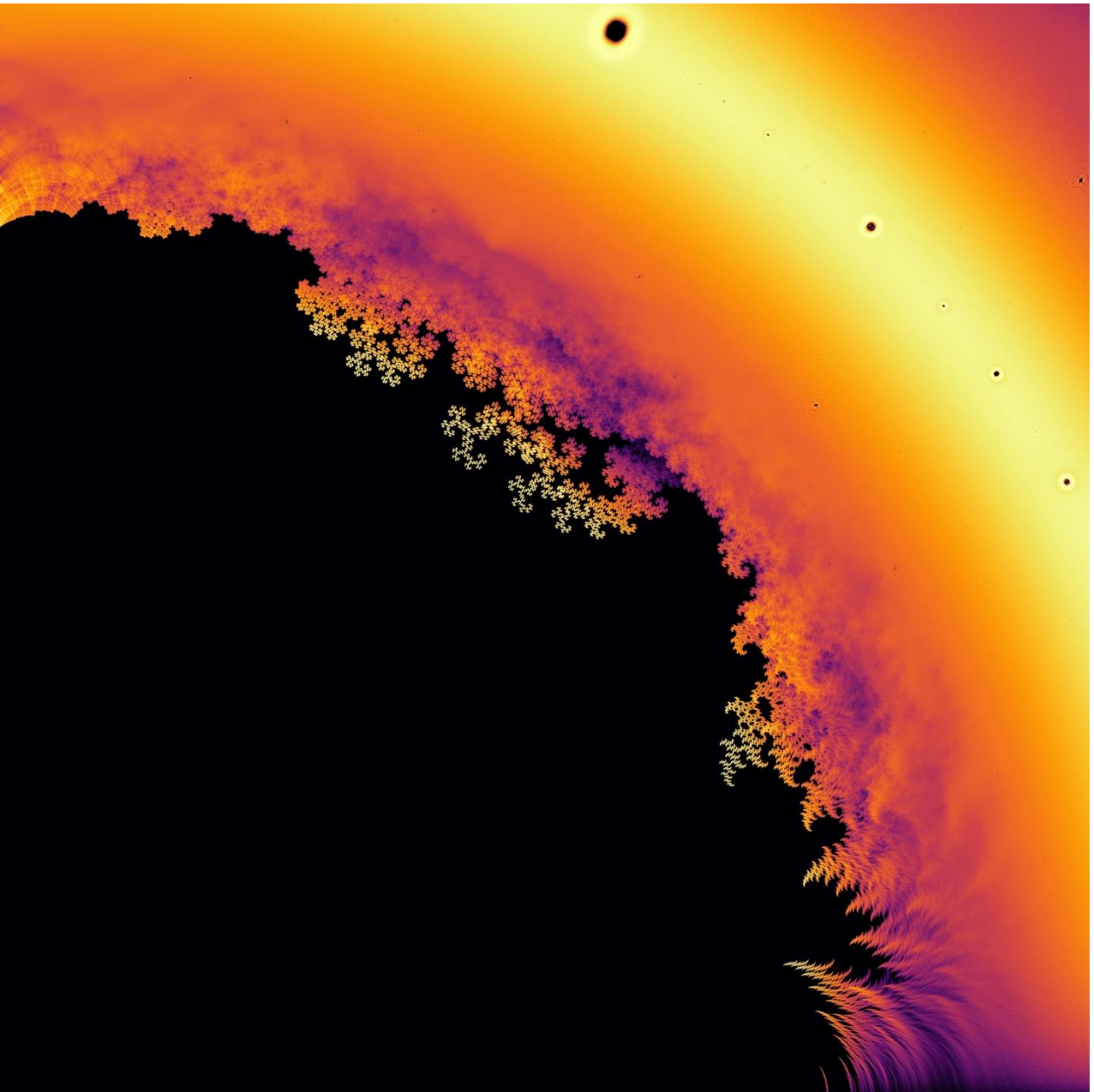


Region around
0.5+0.5i



MATH& 153 - HA (26133)

Which z is a root of a Littlewood Polynomial?



Generalized dragons using z