

Visualizing the distribution of the escape paths of quaternion fractals

S. Halayka*

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Abstract

The distributions of the escape paths of the points in some quaternion fractal sets are visualized.

1 Section 1

As discussed in [1, 2], a 3D scalar field of quaternion magnitudes (e.g. $|Z|$) results from calculating a quaternion fractal set when using a finite 3D lattice of regularly spaced points as input.

Here we visualize the distributions of the escape paths' length and distance (from endpoint to endpoint).

References

- [1] Halayka S. *Some visually interesting non-standard quaternion fractal sets* Chaos, Solitons & Fractals Vol. 41, Issue 5
- [2] Halayka S. *Visualizing the escape paths of quaternion fractals* Unpublished
- [3] <http://paulbourke.net/fractals/trajectories/>

*sjhalayka@gmail.com

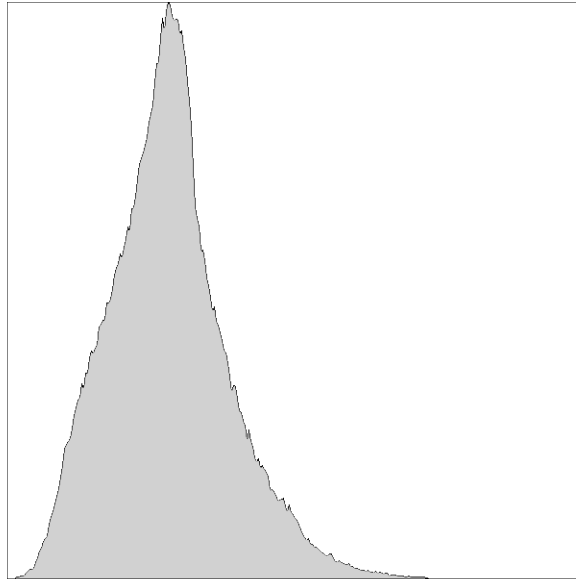


Figure 1: Lengths of $Z' = Z^2 + C$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.

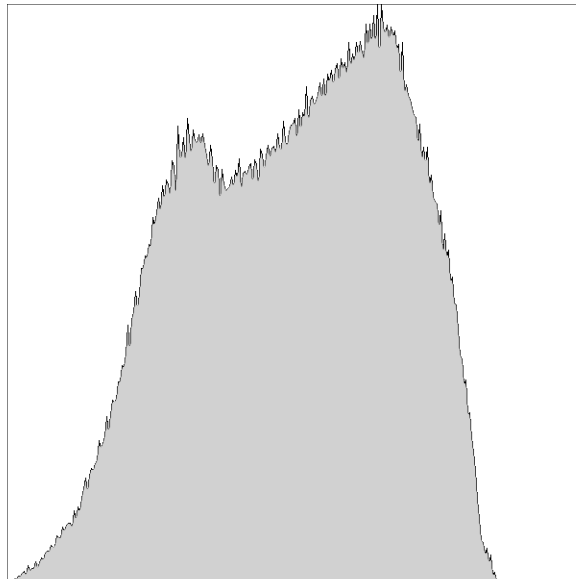


Figure 2: Distances of $Z' = Z^2 + C$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.

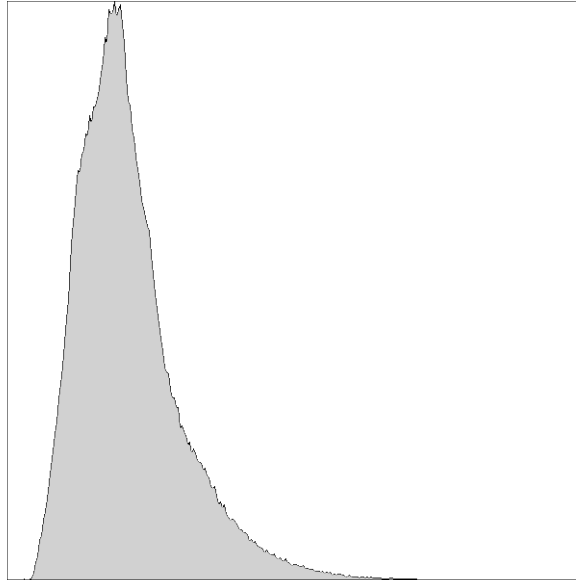


Figure 3: Lengths of $Z' = \sin(Z) + C \cdot \sin(Z)$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.

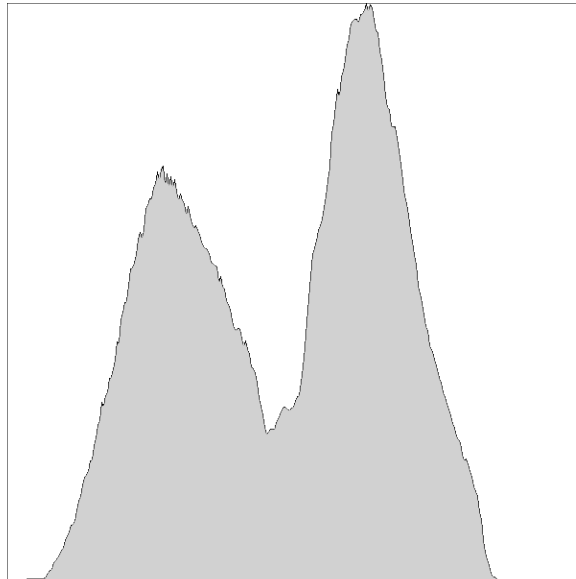


Figure 4: Distances of $Z' = \sin(Z) + C \cdot \sin(Z)$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.