Visualizing the distributions of the escape paths of quaternion fractals

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Abstract

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

1 Escape path length and distance histograms

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


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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 $Z' = Z^5 + C$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.

Figure 4: Distances of $Z' = Z^5 + C$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$. 
Figure 5: Lengths of $Z' = \sin(Z) + C \cdot \sin(Z)$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$.

Figure 6: Distances of $Z' = \sin(Z) + C \cdot \sin(Z)$, where $C_{xyzw} = 0.3, 0.5, 0.4, 0.2$. 

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