Topology of plane sections of periodic polyhedra with an application to the Truncated Octahedron

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APPENDIX

Abstract

This appendix, available on-line only, contains a series of high-resolution pictures showing the structure of the fractal associated to the topology of plane sections of the truncated octahedron, as explained in the main body of the paper.

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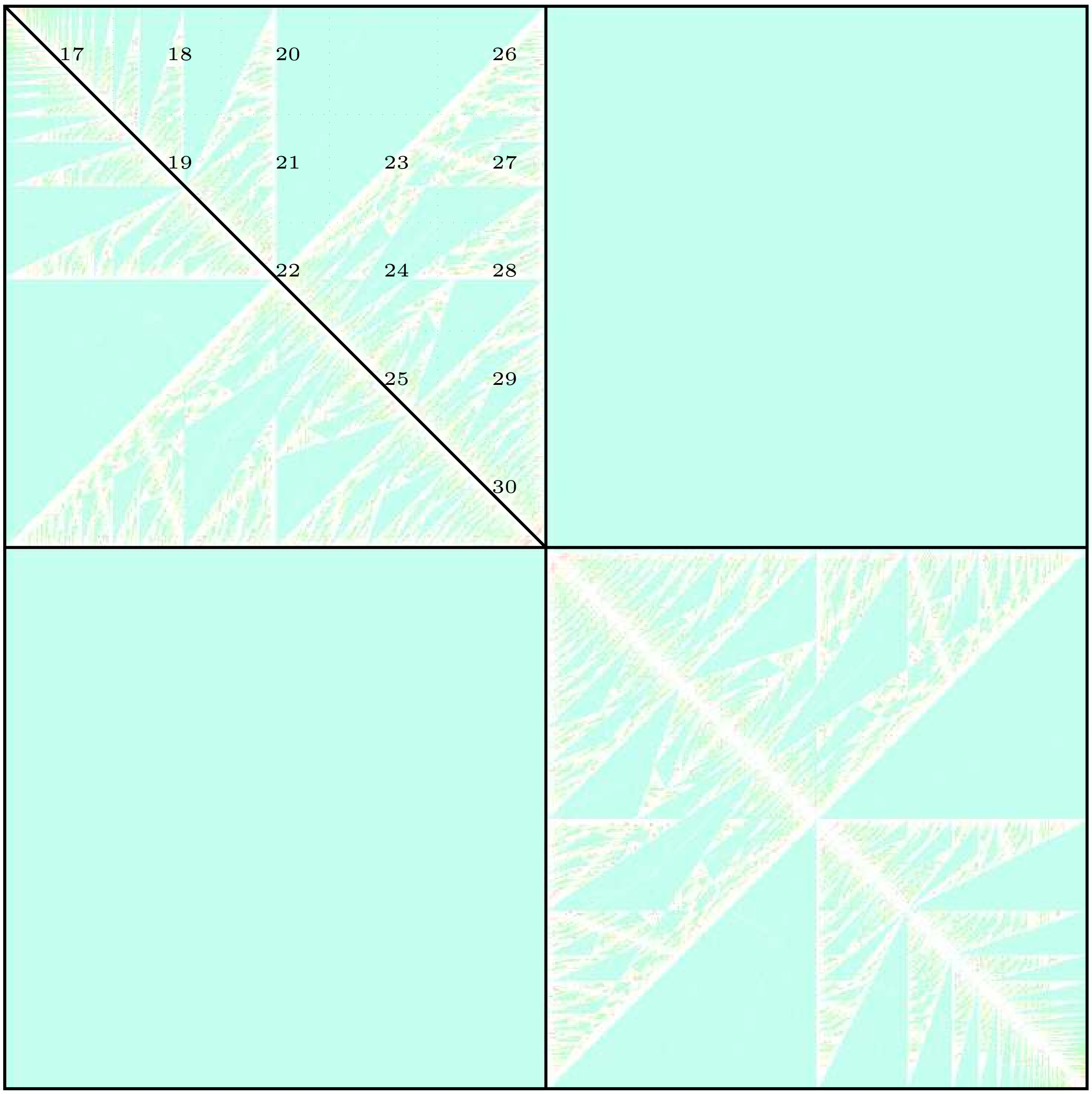

Figure 16: The next 14 pictures show, in full detail, the fractal structure of $\mathcal{S}(\mathcal{P}_0) = \mathcal{S}(\mathfrak{h})$ sampled at the resolution $r = 10^4$. In order to minimize the CPU time, the numerical analysis was limited to the triangle $[(0,1,1)]$, $[(1/2,1,1)]$ $[(1/2,1/2,1)]$, divided above the diagonal into smaller squares and triangles by a uniform grid and labeled by the corresponding figure number; the full picture can be retrieved by applying the "topological" symmetry characteristic of this surface, namely the symmetry with respect to the antidiagonal, and then the 24 symmetries coming from the action of the tetrahedral group T_d. To retrieve these data we used about 20 1GHz Pentium III CPUs for about 3 months. In all pictures, the color of the islands goes from green to red as the norm of the label grows. Note that the square $[.4,.5] \times [.9,1]$ is fully contained inside the island $\mathcal{D}_{(1,2,2)}$ and therefore its picture will not be shown.

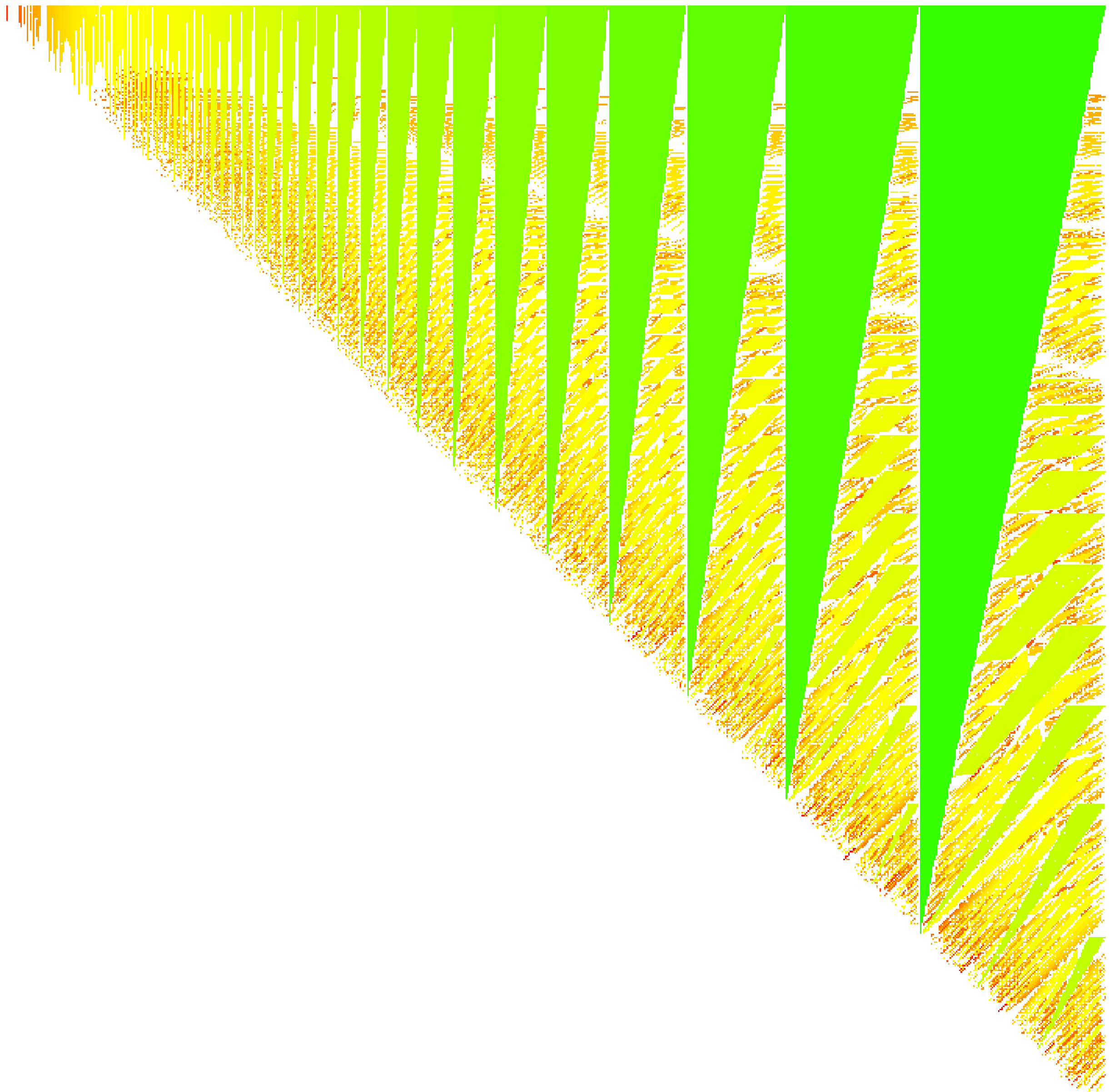

Figure 17: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[0, .1] \times [.9, 1]$

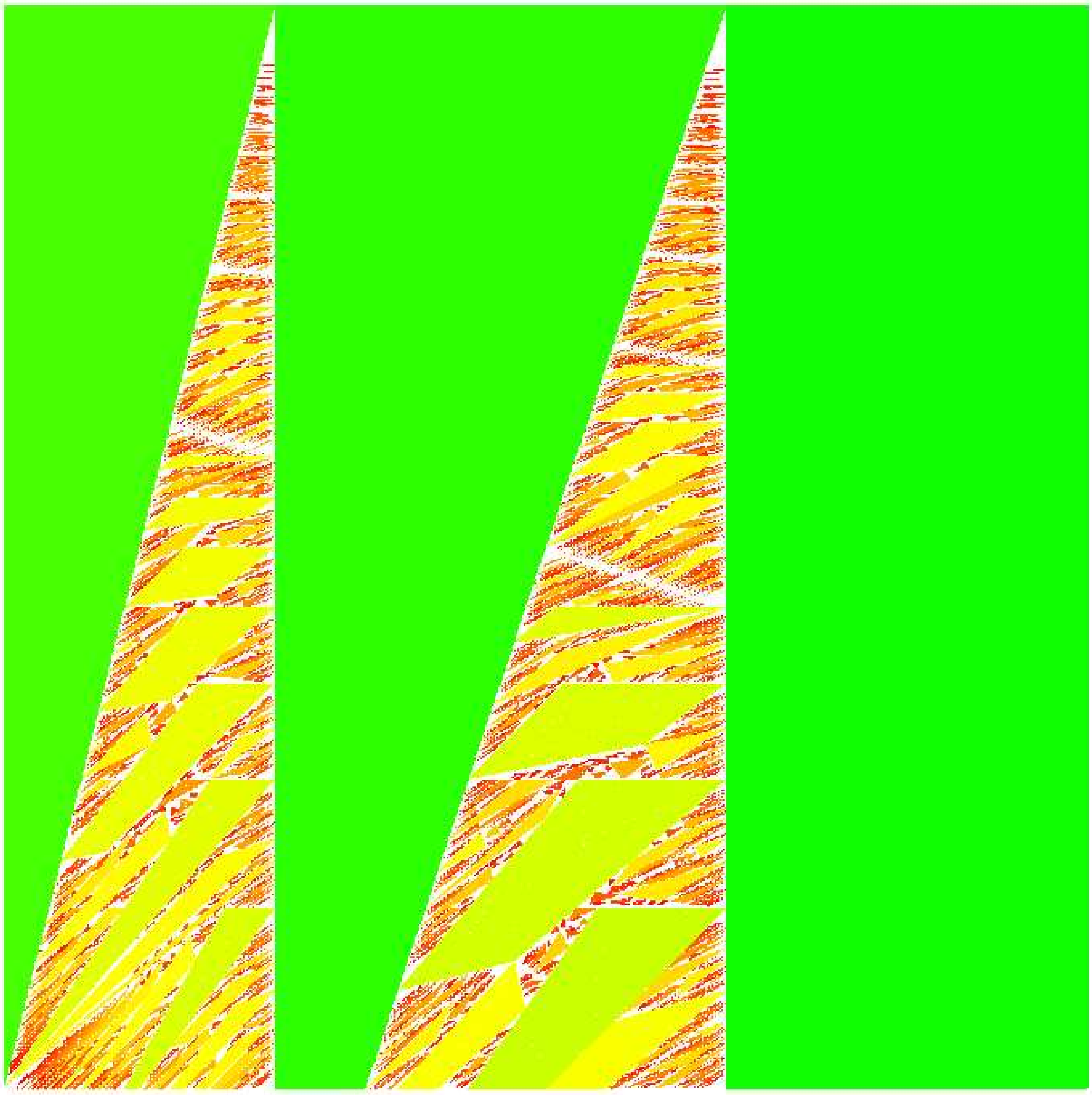

Figure 18: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.1, .2] \times [.9, 1]$

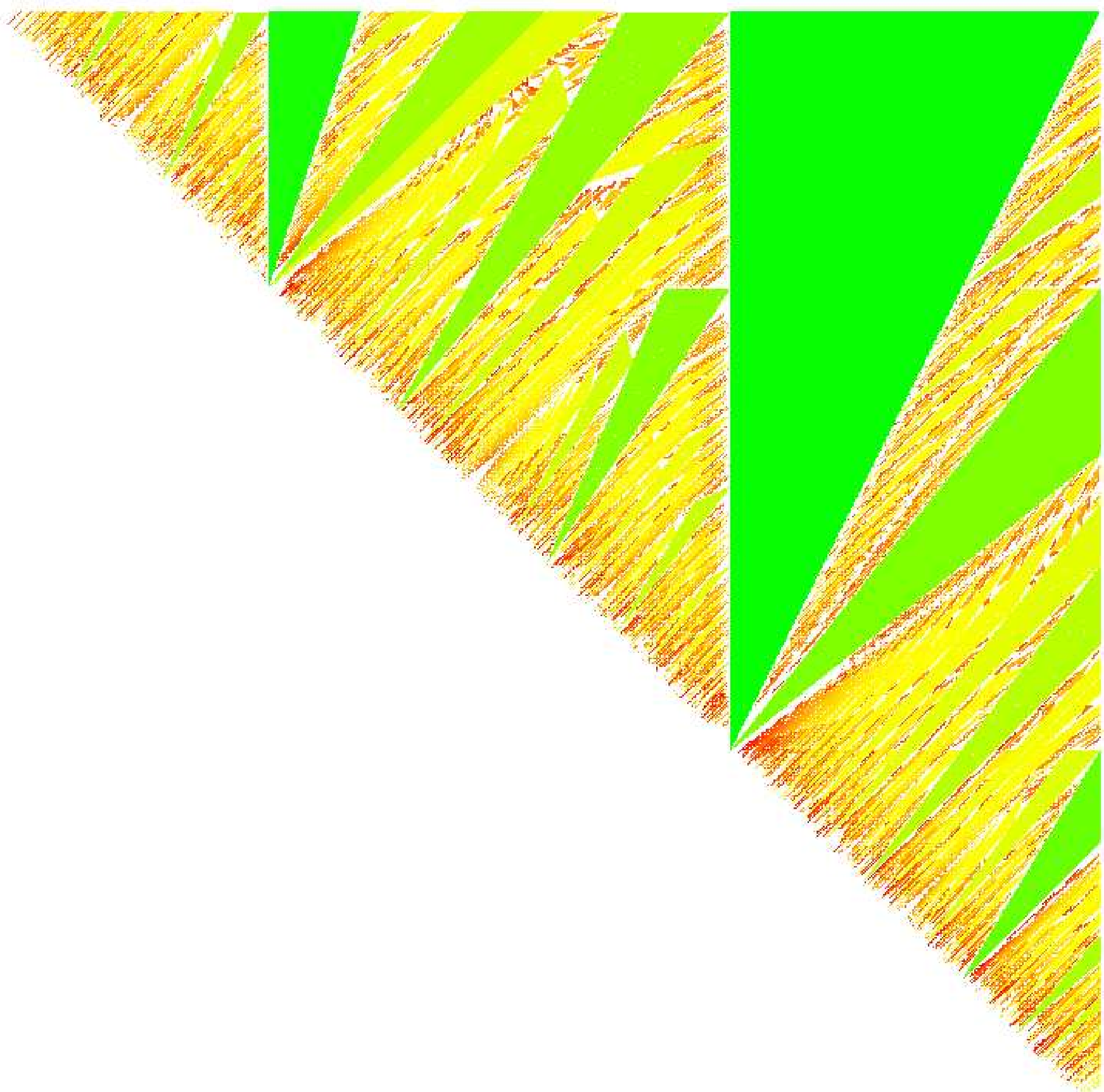

Figure 19: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.1, .2] \times [.8, .9]$

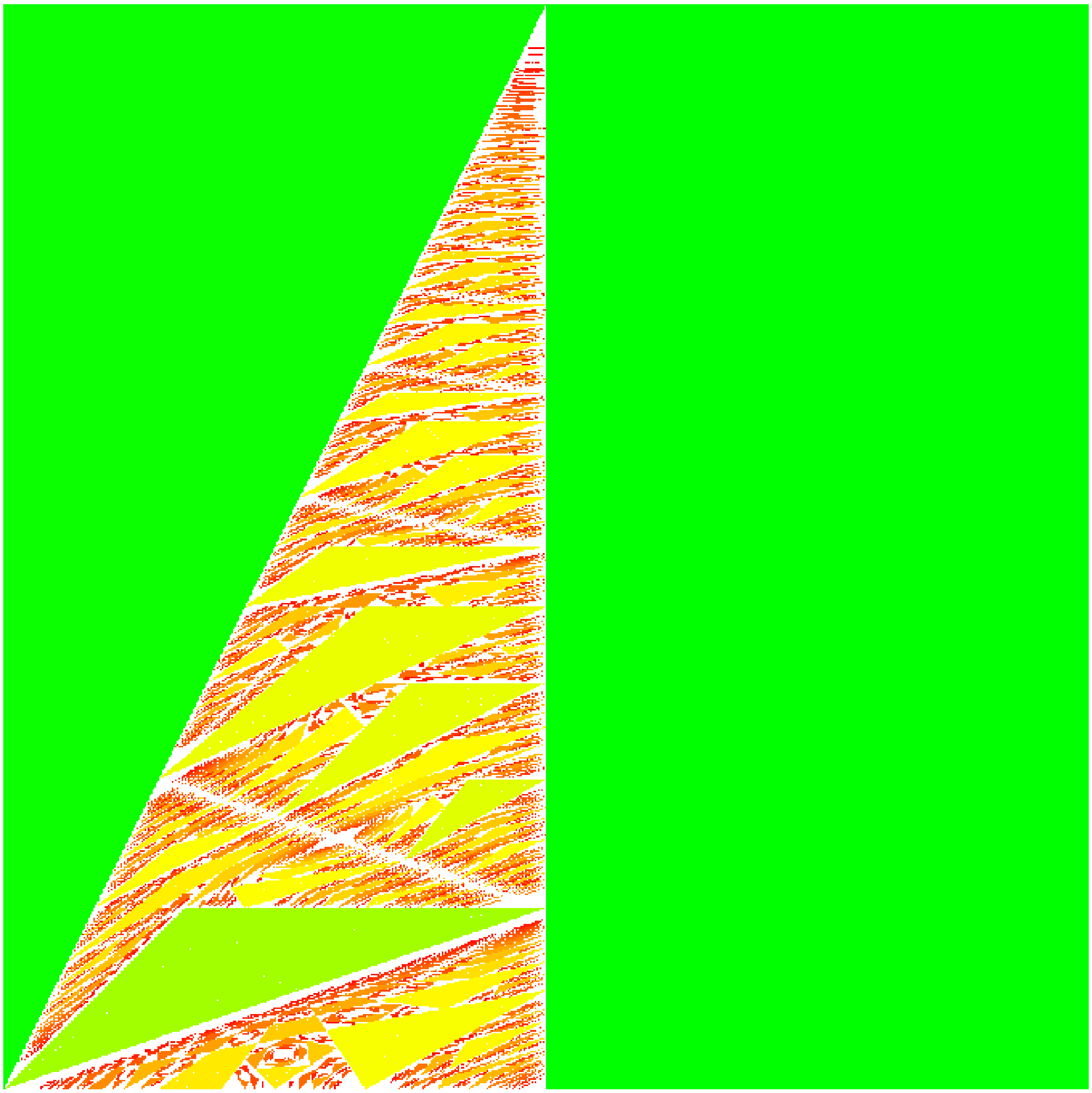

Figure 20: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.2, .3] \times [.9, 1]$

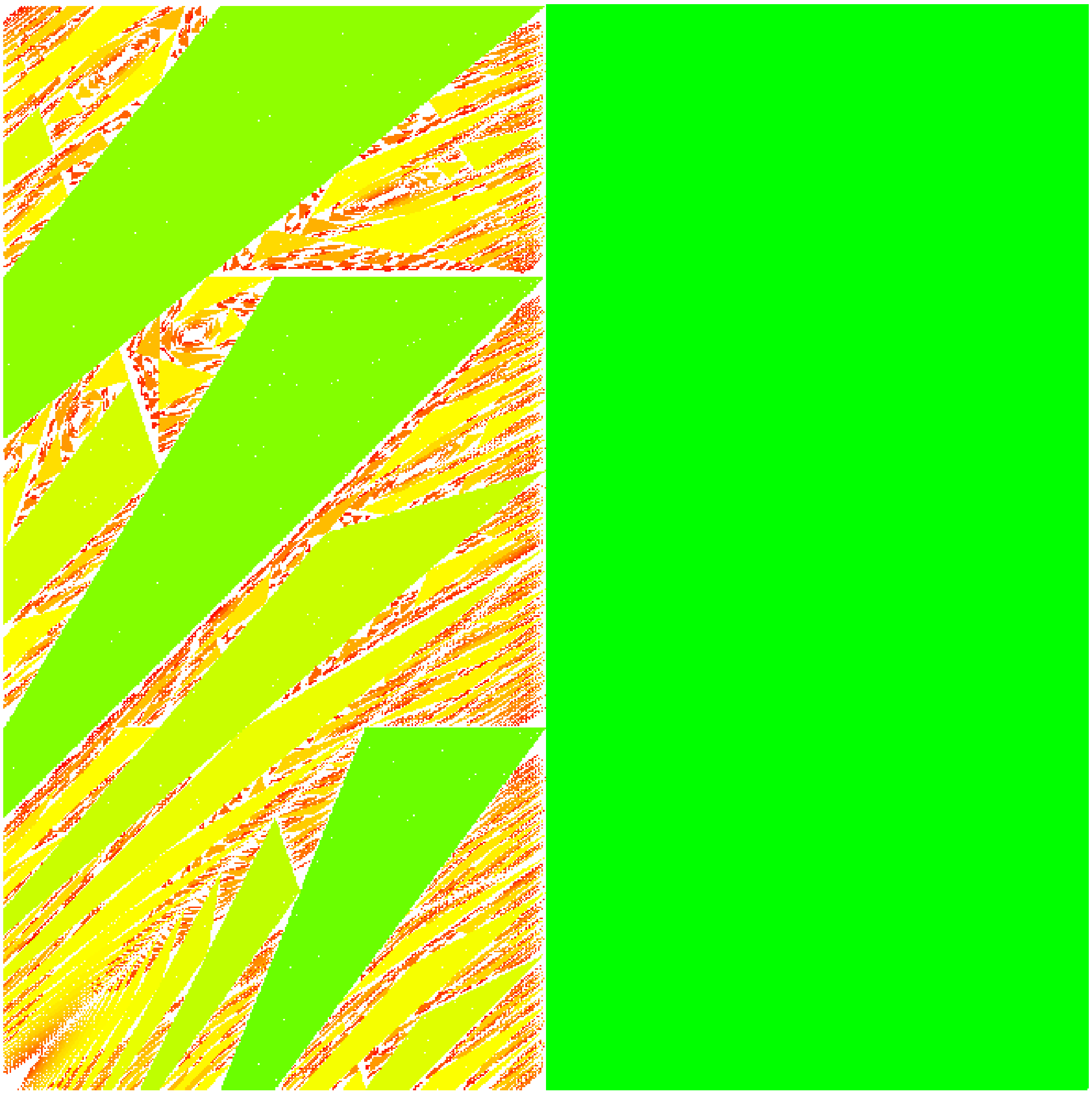

Figure 21: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.2, .3] \times [.8, .9]$

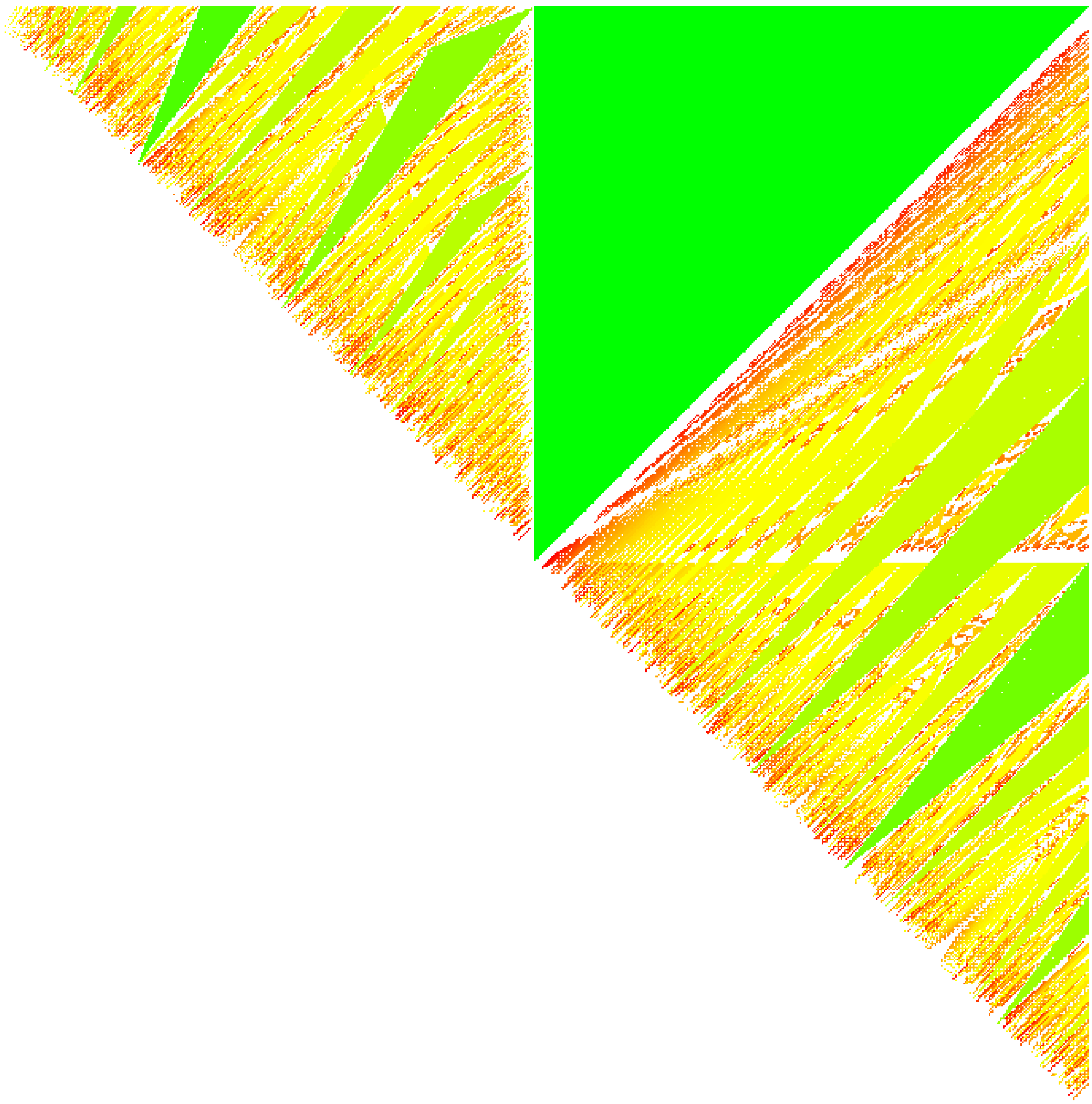

Figure 22: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.2, .3] \times [.7, .8]$

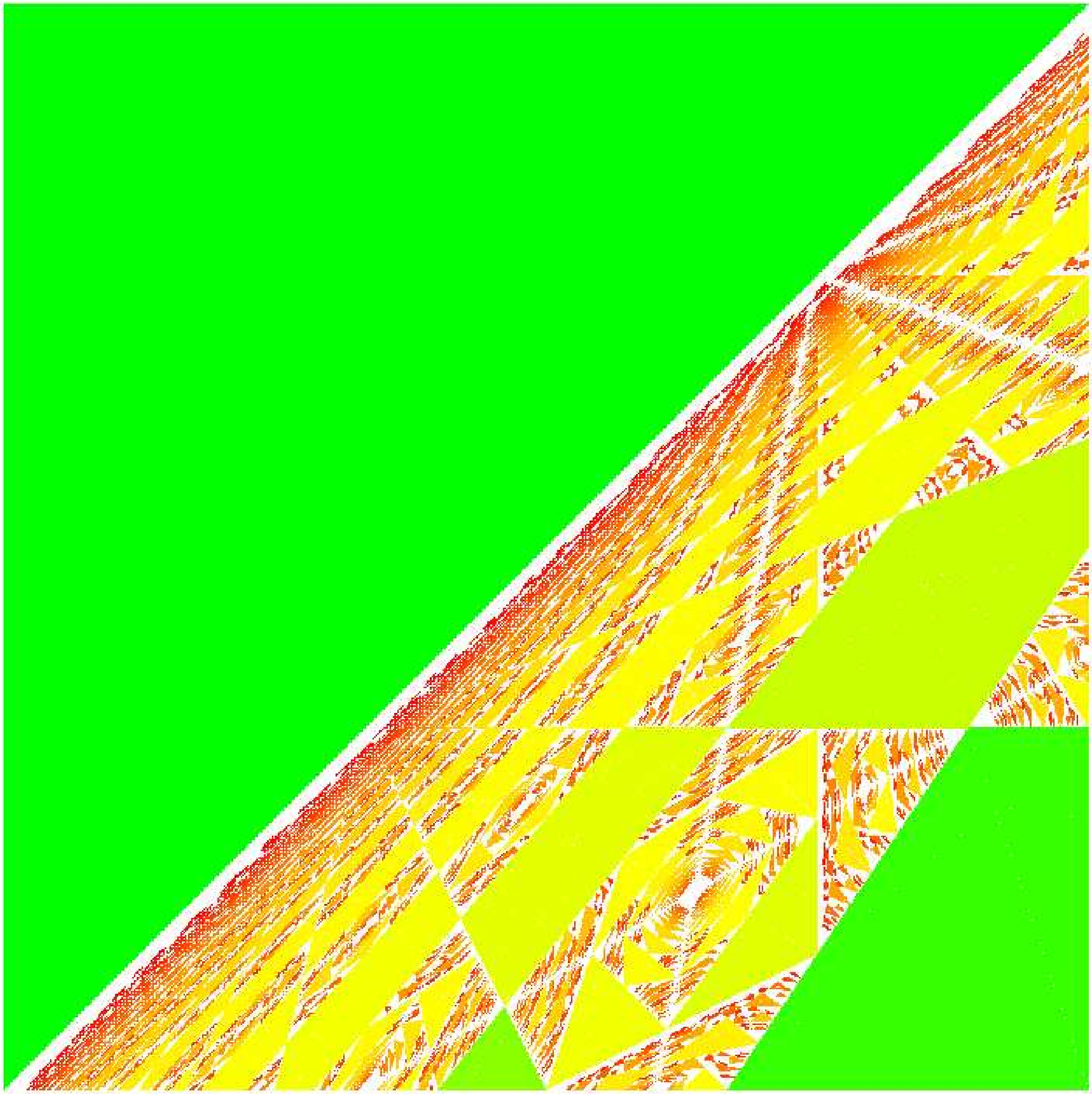

Figure 23: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.3, .4] \times [.8, .9]$

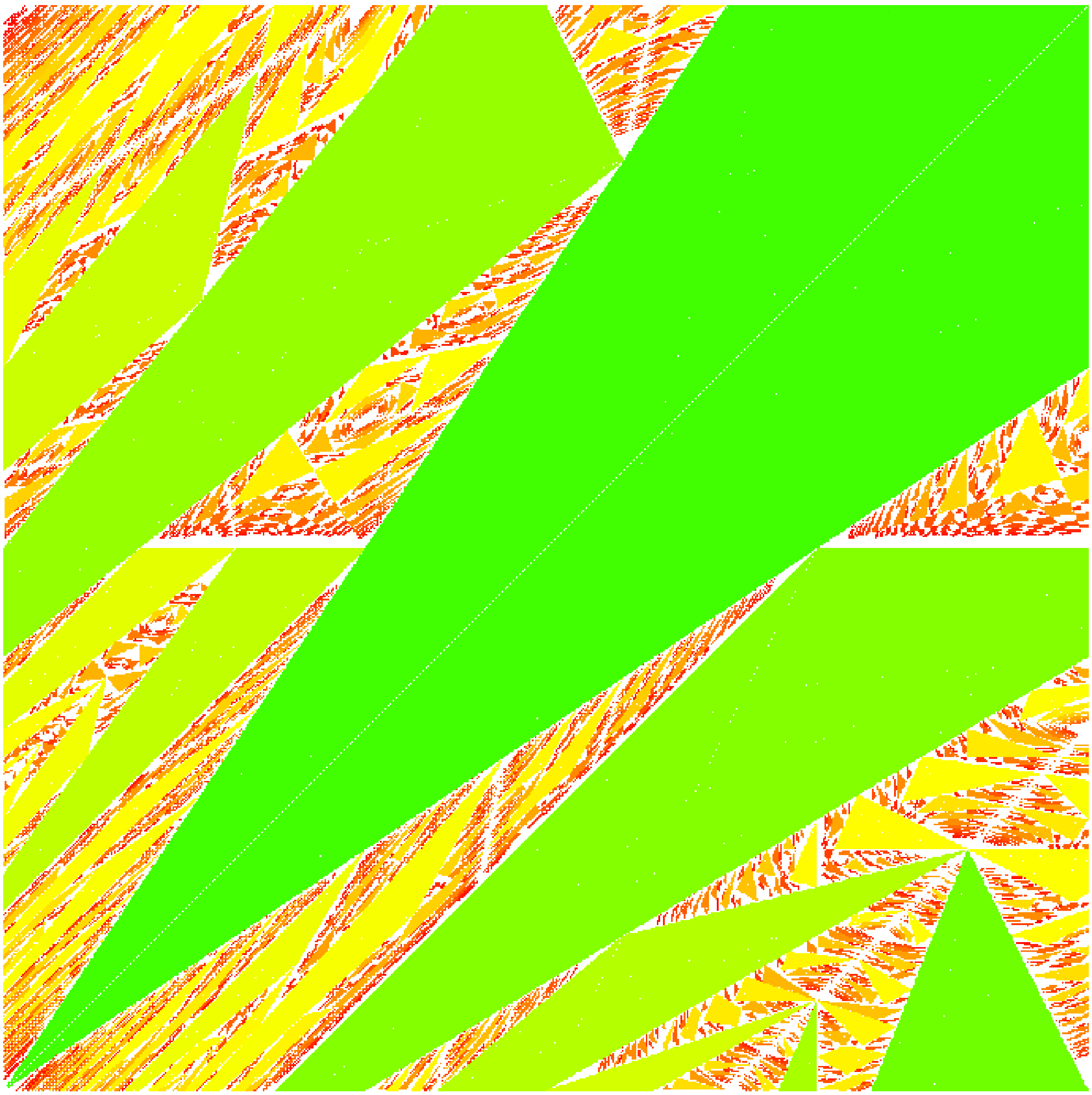

Figure 24: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.3, .4] \times [.7, .8]$

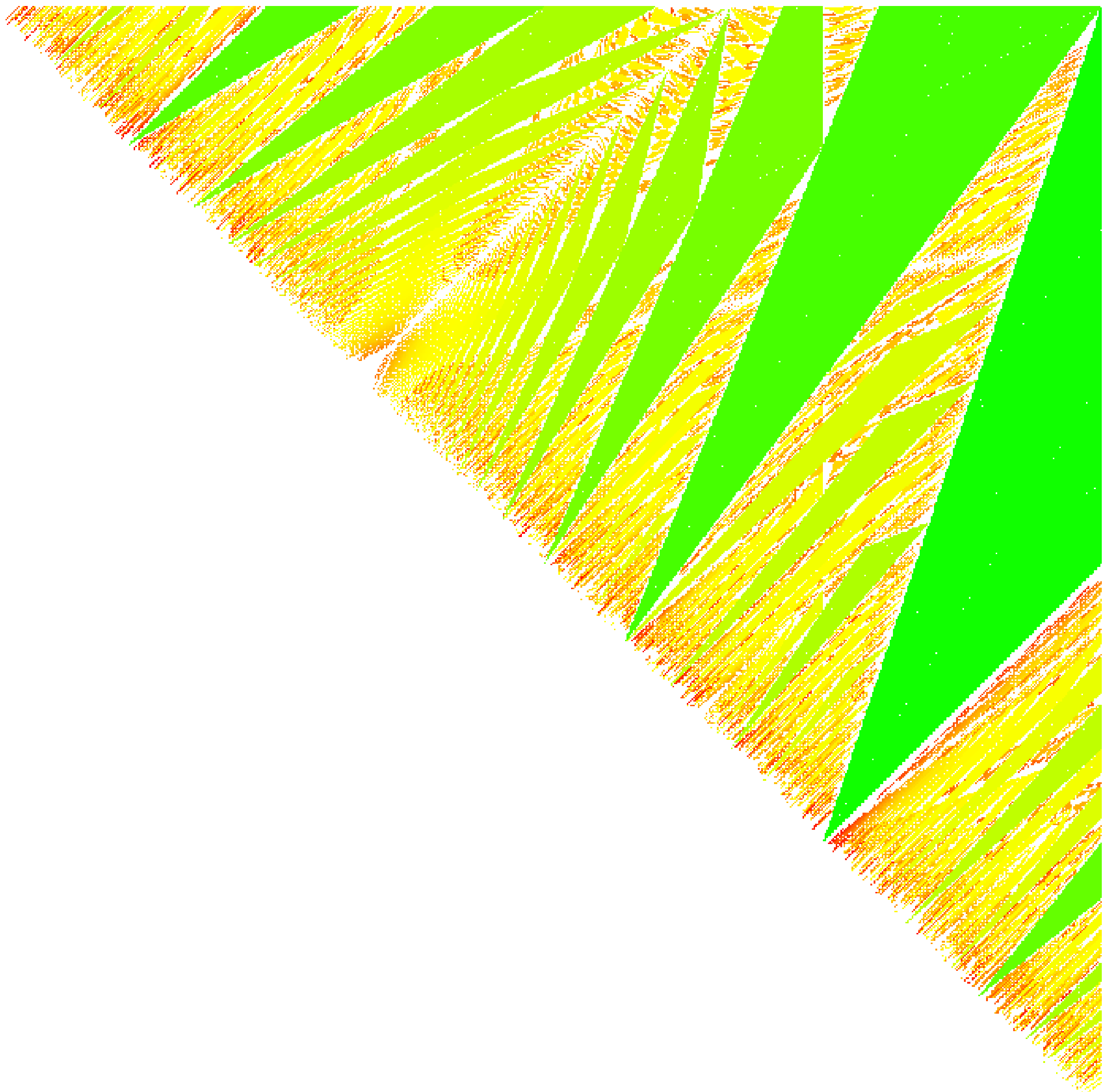

Figure 25: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.3, .4] \times [.6, .7]$

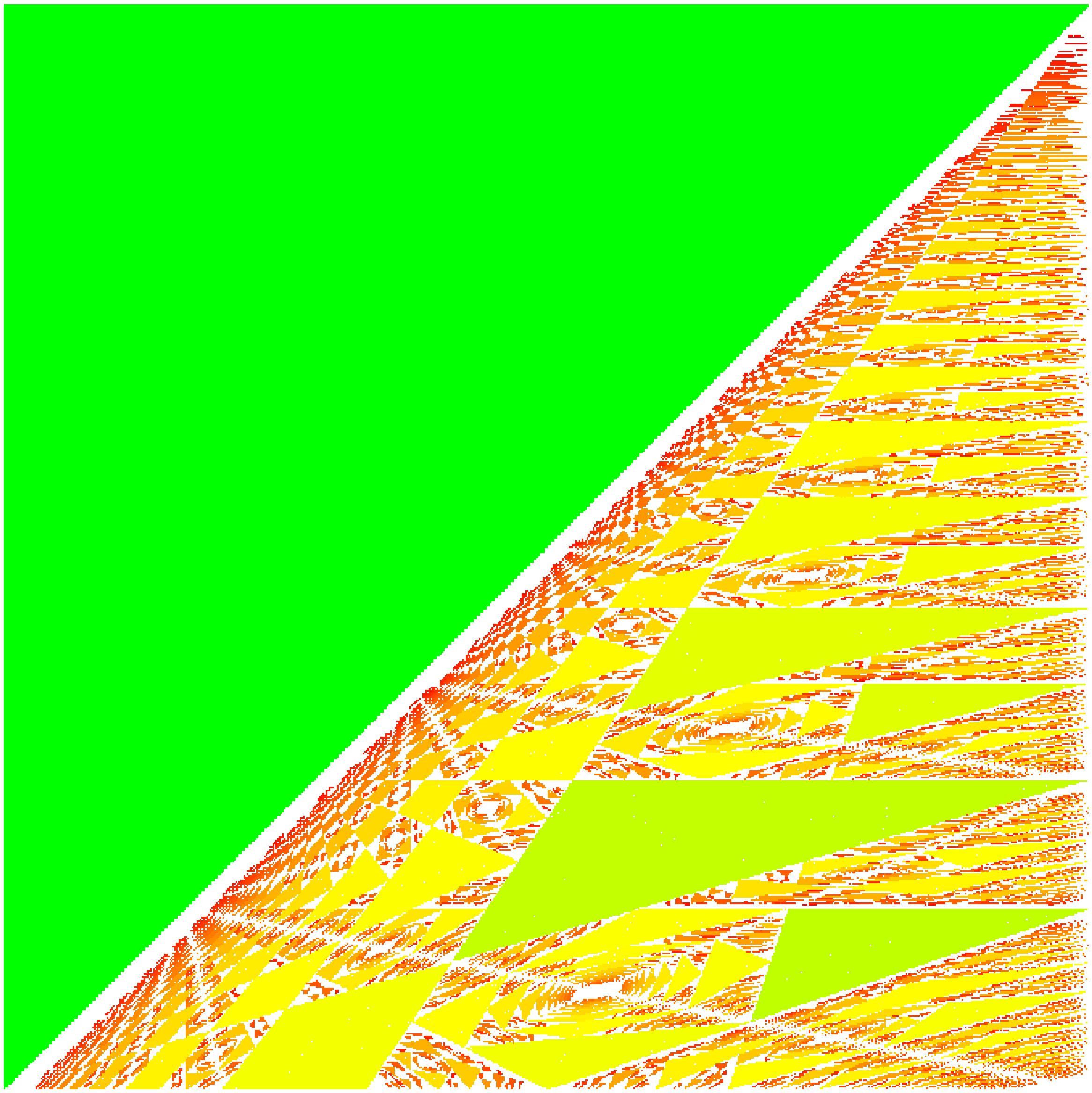

Figure 26: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.4,.5] \times [.9,1]$

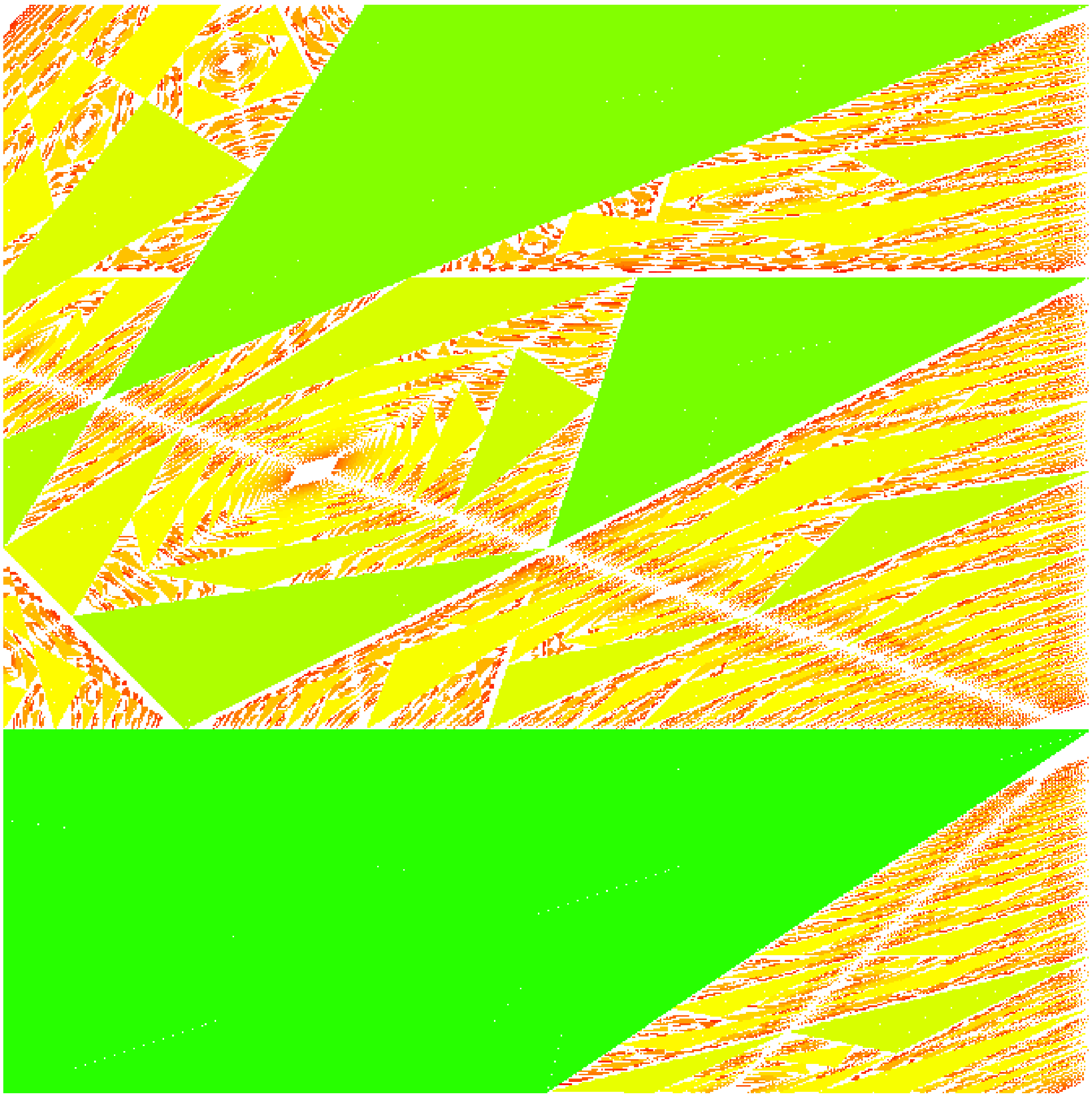

Figure 27: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.4, .5] \times [.8, .9]$

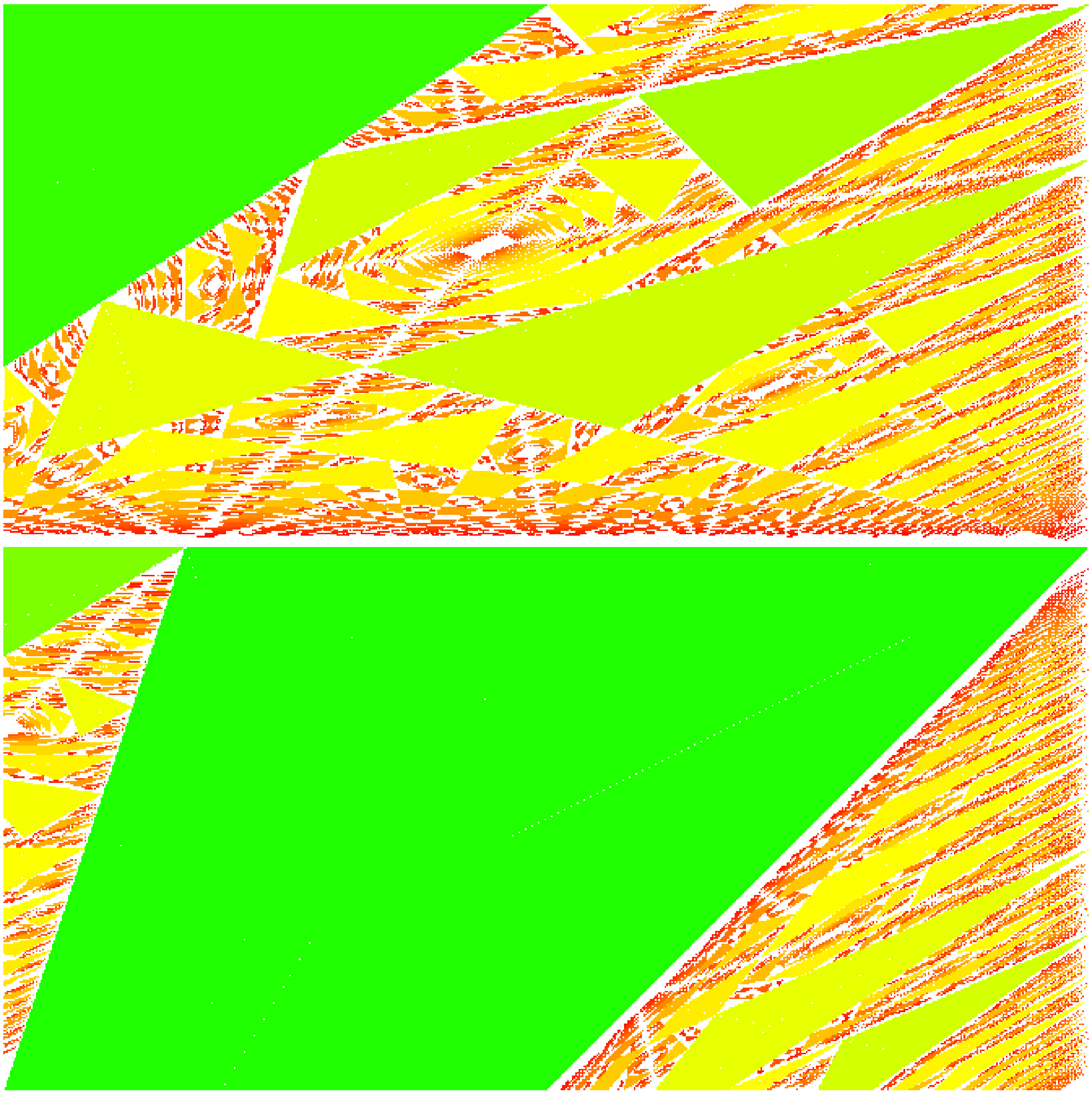

Figure 28: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.4, .5] \times [.7, .8]$

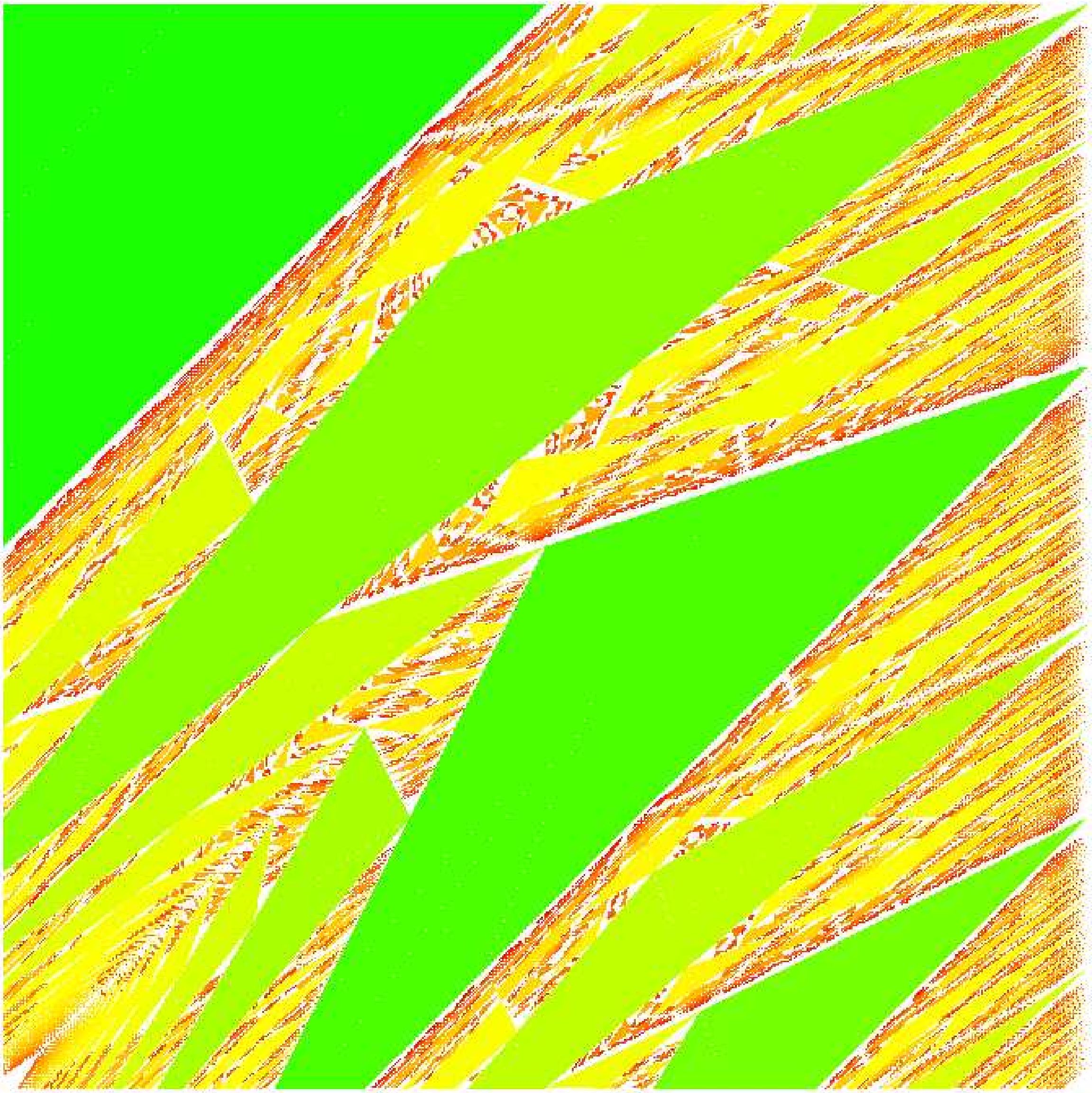

Figure 29: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.4, .5] \times [.6, .7]$

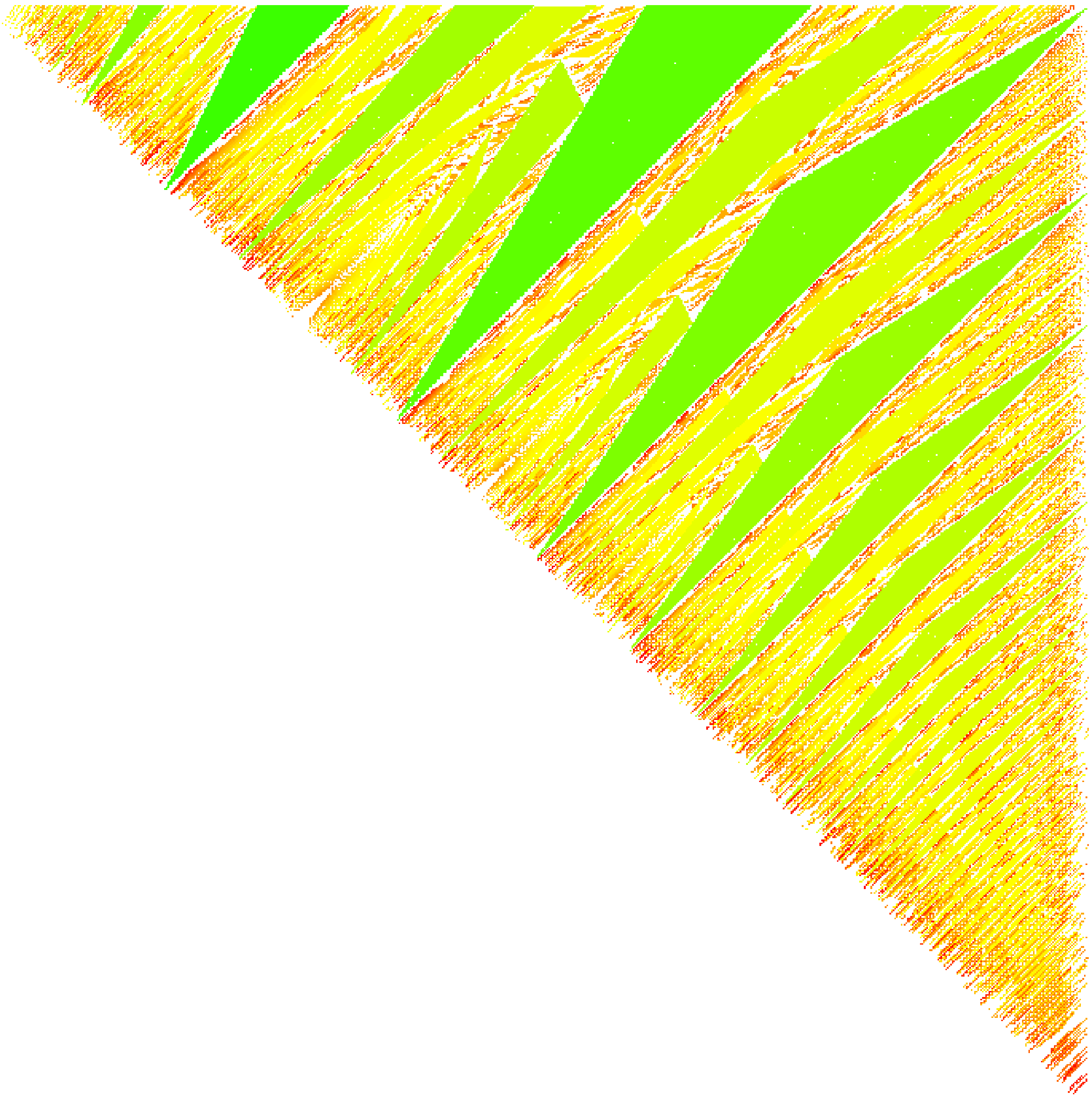

Figure 30: Detail of $\mathcal{S}(\mathcal{P}_0)$ in $[.4, .5] \times [.5, .6]$