Question 201: A fractal image

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abstract

This note presents a fractal image for $f(z)=\ln(1+g(z))$.

1. Introduction. Two integrals

$$\int_0^{\infty}\left(e^{-1/x^2}-e^{-2/x^2}\right)dx=\sqrt{\pi}\left(\sqrt{2}-1\right) \tag{1}$$

$$\int_0^1\left(\sqrt{-\frac{1}{\ln\left(\frac{1+x}{2}\right)}}-\sqrt{-\frac{1}{\ln\left(\frac{1-x}{2}\right)}}\right)x\,dx=2\sqrt{\pi}\left(\sqrt{2}-1\right) \tag{2}$$

2. The functions $f(z)$ and $g(z)$.

$$g(z)=\left(\sqrt{-\frac{1}{\ln\left(\frac{1+z}{2}\right)}}-\sqrt{-\frac{1}{\ln\left(\frac{1-z}{2}\right)}}\right)z \tag{3}$$

$$f(z)=\ln(1+g(z)) \tag{4}$$

3. Fractals for $f(z)$.

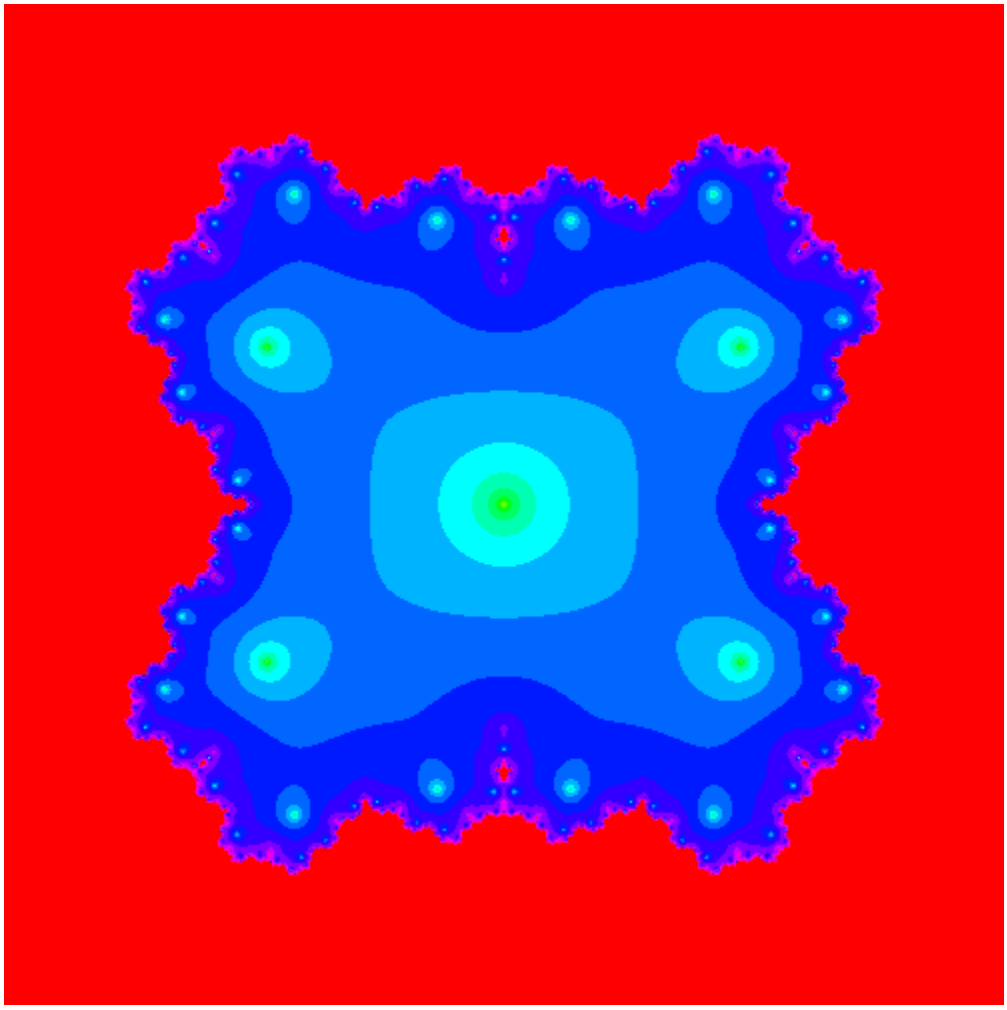

Figure 1.

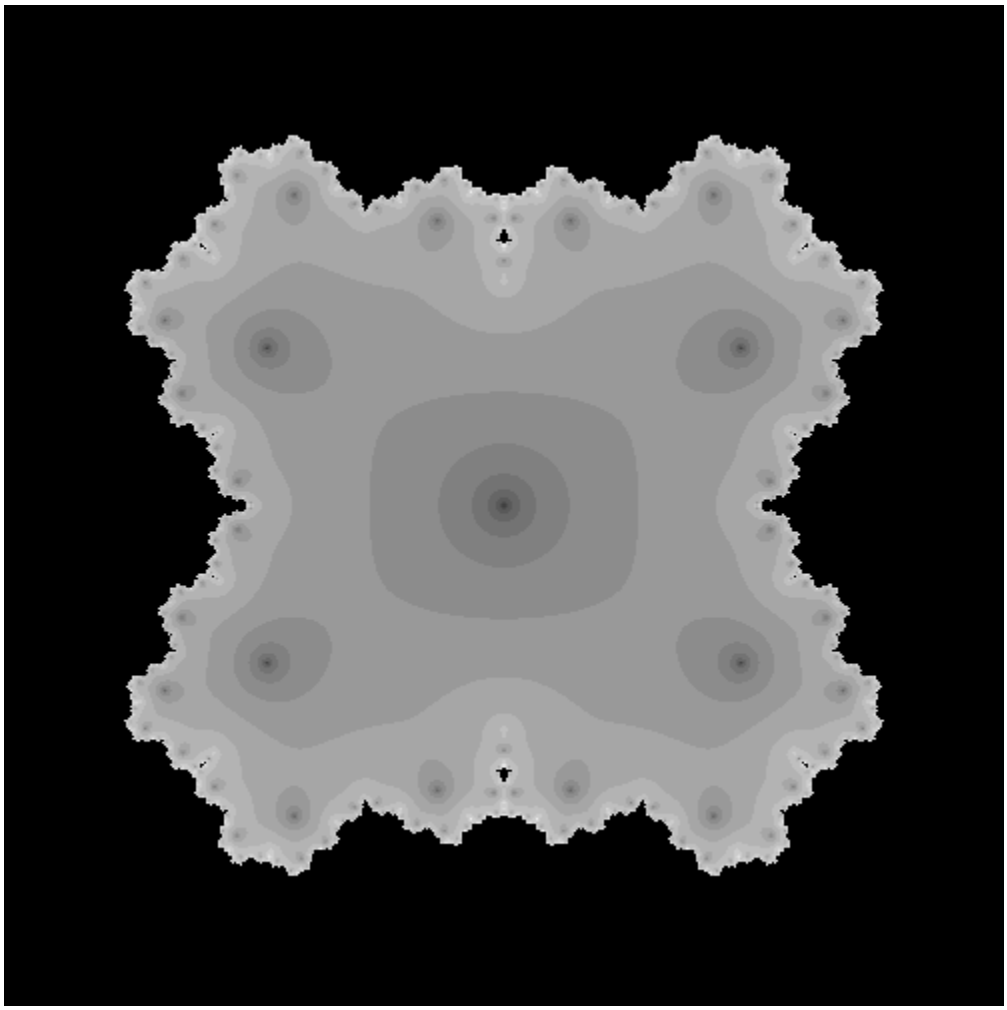

Figure 2.

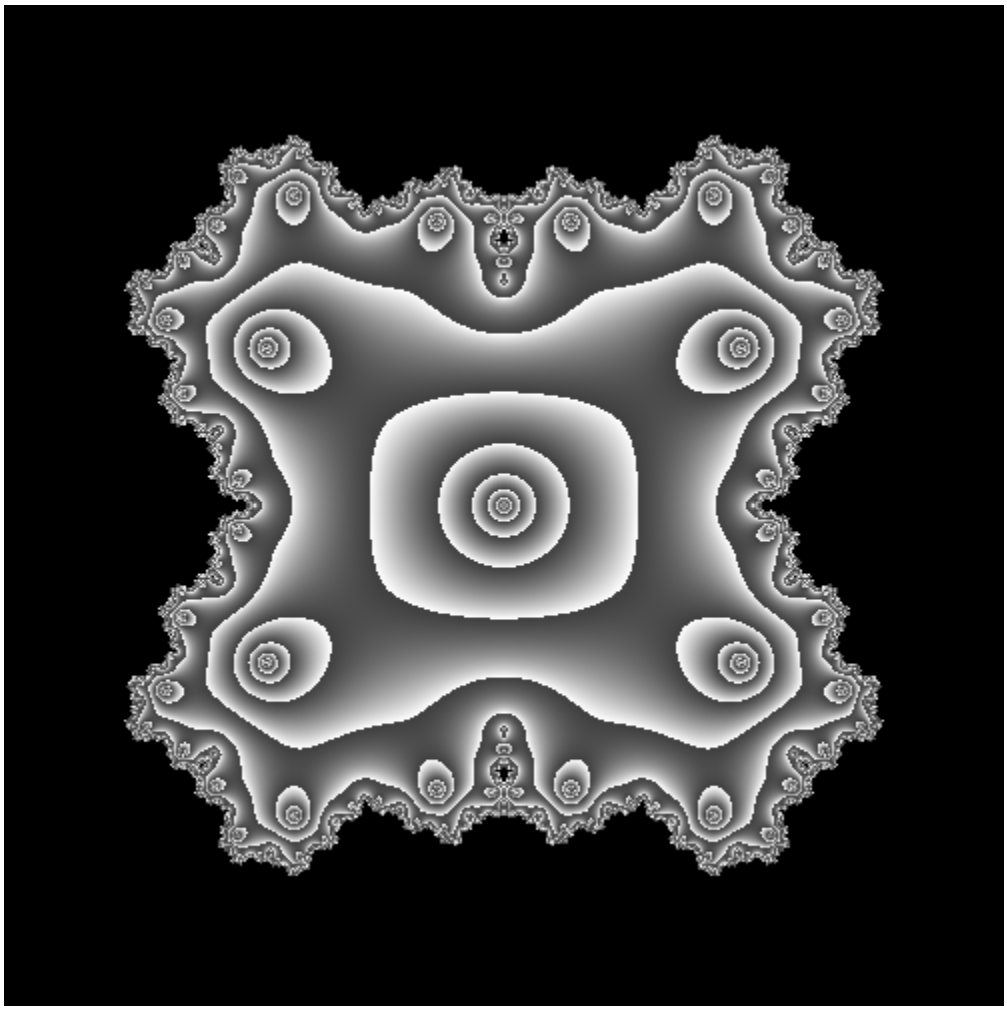

Figure 3.

4. Fractals for $\ln\left(1+z\,g\left(z\right)\right)$.

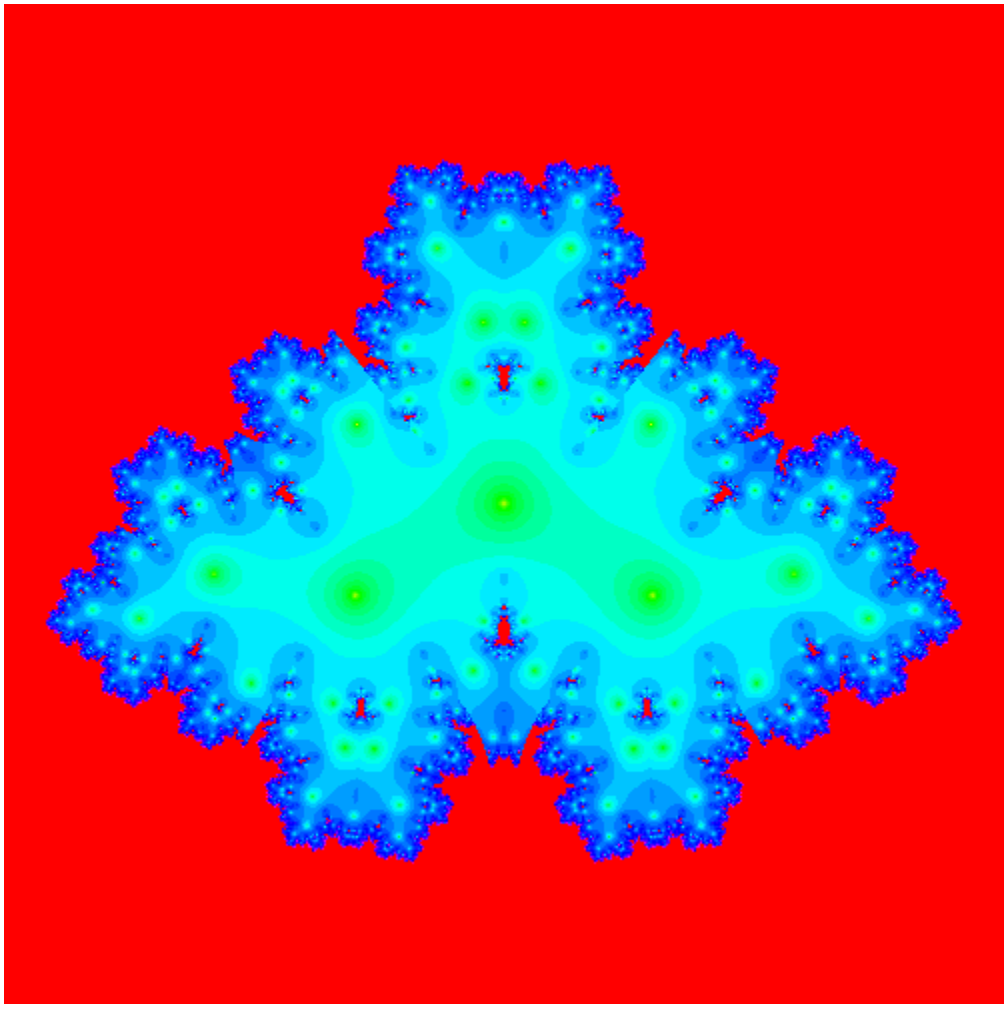

Figure 4.

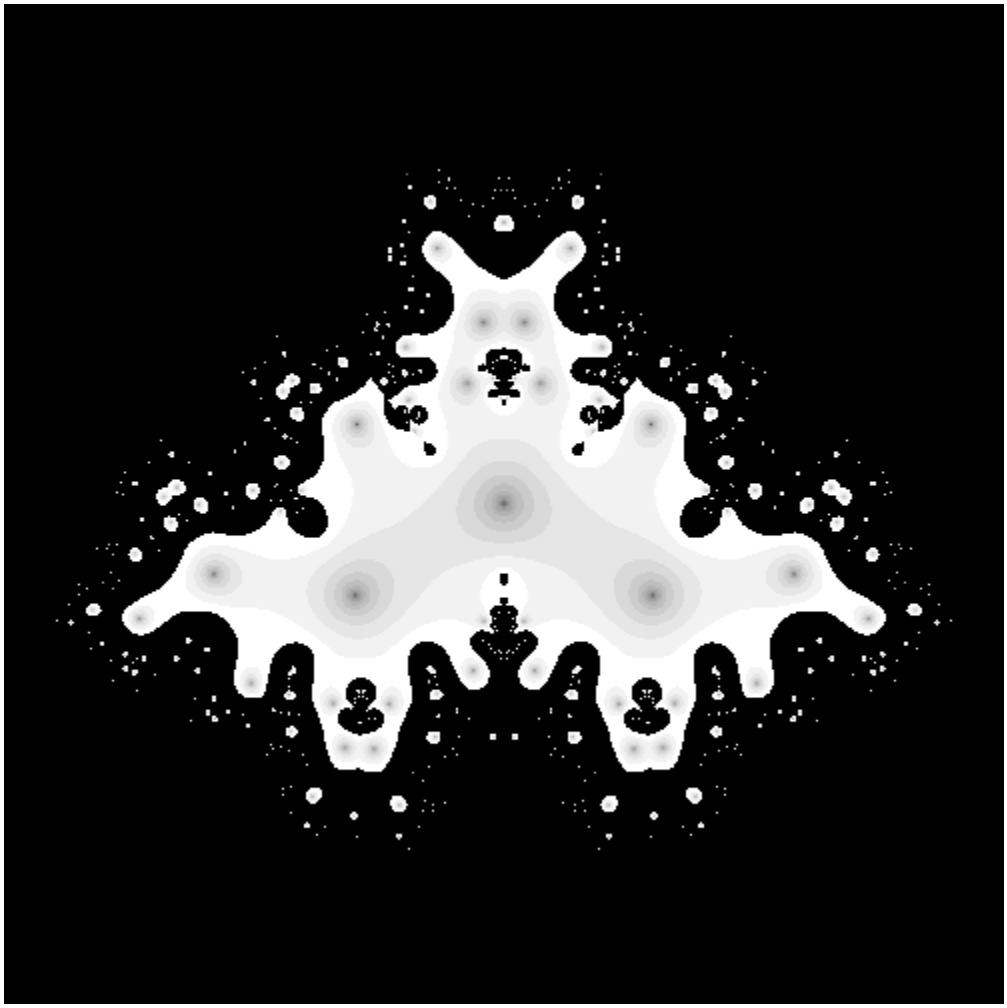

Figure 5.

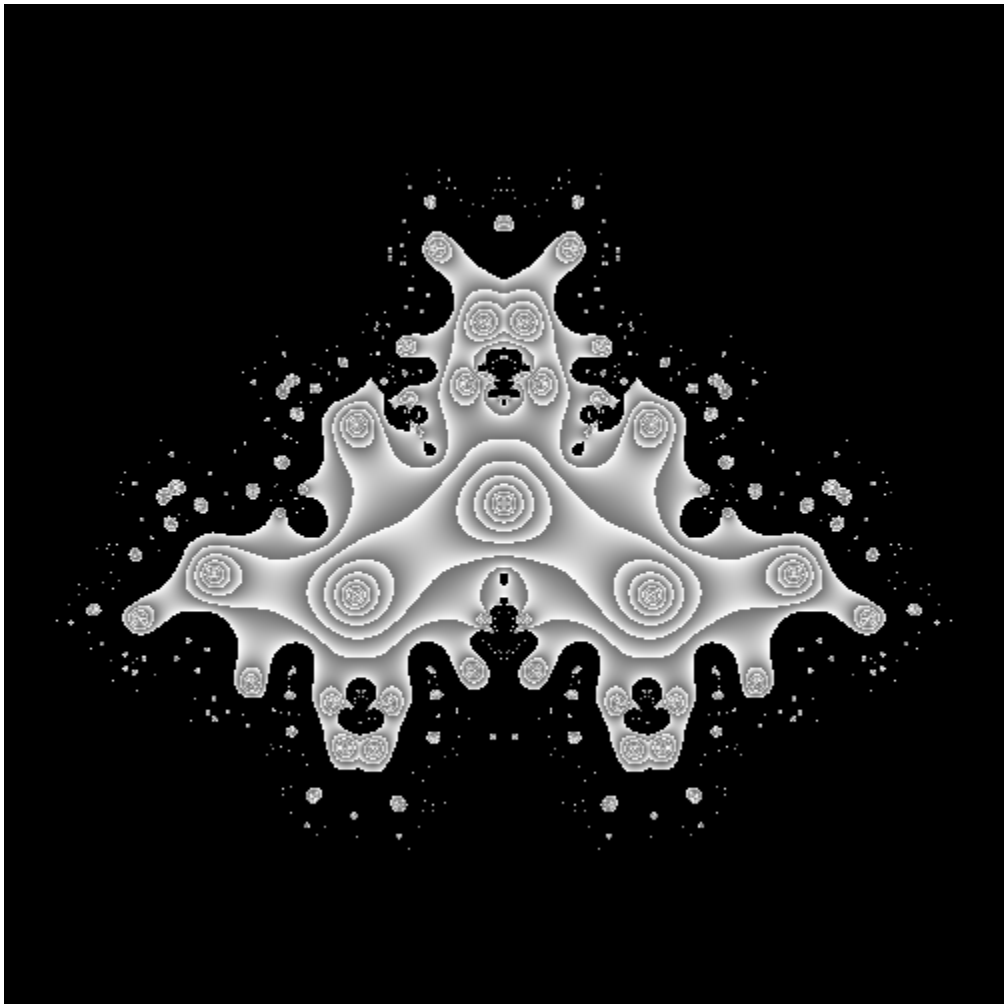

Figure 6.

References

1. Devaney, R.L.: A First Course in Chaotic Dynamics Systems. westview Press.1992.
2. Milnor, J.: Dynamics in One Complex Variable. Introductory Lectures, Vieweg, 1999.