

HYPERBOLIC GEOMETRY AND CHAOS IN THE COMPLEX PLANE

Instances of hyperbolic geometry come up in nature whenever a system starts developing fast interconnections. Examples include trees, the human brain and the internet. A tell-tale signature is the existence of a fractal in one dimension less, e.g. the surfaces of trees and brains in the above examples. After dealing with the above examples, we shall discuss a special case where the fractals emerge in the complex plane as a result of symmetries of hyperbolic 3-space. These symmetries act on the complex plane as well; however the dynamics being chaotic, it is hard to get a hold on them directly. Instead we go to hyperbolic geometry in 3 dimensions, set up a dictionary between the two and finally get a hold on the fractals in the complex plane through our study of hyperbolic geometry in 3 dimensions.

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