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Remodeling Fractals

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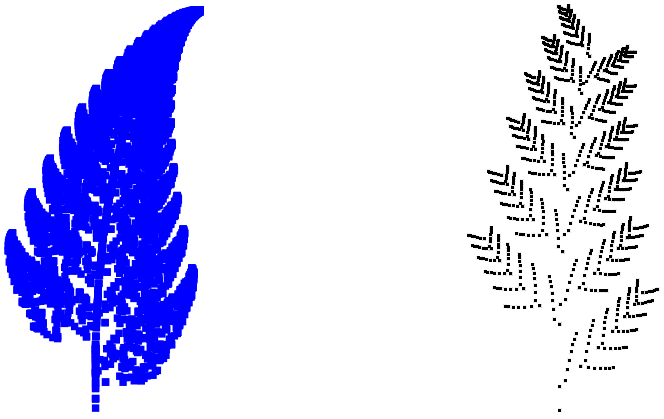
A set having a non-integer Hausdorff-Besicovitch dimension (popularly known as fractal dimension) is called fractal [1-3]. The concept of fractal creates a geometry called fractal geometry where the shapes exhibit self-similarity(strictly speaking, self-affinity) at all scales of magnification or dilution [1-3].

Shapes created by fractal geometry or evaluated by fractal dimension have a great deal of significance in terms nonlinear science and engineering. All basic sciences (biology, physics, and chemistry) and applied sciences (biomedical engineering, manufacturing engineering, and alike) have been benefited by the shape modeling ability of the fractal geometry and shape evaluating ability of the fractal dimension.

However, a random walk consisting of some contracting mappings known as Iterated Function System (IFS) has been developed to create fractals [4]. An IFS-generated fractal (e.g., the fractal shown in the left-hand-side in Figure 1) is nothing but a point-cloud (i.e., a set of randomly generated points). However even though one can model a complex shape using a fractal, it may not be manufactured accurately [5,6]. Therefore, remodeling of fractals is necessary.A possible way, is the one by Sharif Ullah *et al.* [5,6], that have developed some procedures to remodel an IFS-fractal. A remodeled fractal is shown in the right-hand-side of Figure 1. The main idea is to control the levels of self-similarity by having a deterministic walk replacing the random walk among the contracting mappings. The remodeled fractal shown in Figure 1 exhibits self-similarly up to the third level.To find out the degree of similarity among the original and remodeled fractal, one can use the DNA based computing [7].



(a fractal having 5000 points) (a redesigned fractals)

Figure 1. Remodeling of an IFS-generated fractals.

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