Fractal Approximation of Non-Smooth Functions
by Fractional Operators

Interpolation schemes are being developed enormously and reported in various places in the literature. However, when all classical approaches are directed towards construction of smooth functions, the fact that many experimental and natural signals are rough having a dense set of non-differentiable points was easily ignored often. In order to overcome this problem, the fractal interpolation function has been invented as a fixed point of certain operator on function space by using iterated function system which stipulates that the density of non-differentiable points in a continuous function. The fractal interpolation techniques supply a general frame for understanding of complexities that prevail in nature and classical interpolants are generalized by means of fractal interpolants. While approximation of continuous function in terms of polynomial is given by Weierstrass theorem, approximation of non-smooth function is important as objects in universe in general abounds with the class of functions of continuous everywhere and nowhere differentiable. Hence, this lecture pay more attention to the problem of how to portray non-smooth functions by fractal interpolation function from different aspects. In order to analyze the irregularity (non-smoothness) of fractal functions, this lecture presents the fractional operator on fractal functions.

A. Gowrisankar
Department of Mathematics,
School of Advanced Sciences,
Vellore Institute of Technology,
Vellore, Tamil Nadu, India.