1054-28-146   **Nishu Lal*** (`nishul@math.ucr.edu`), University of California, Riverside, Department of Mathematics, 261 Surge Building, Riverside, CA 92521. *Spectral Analysis on self-similar sets and spectral zeta function.* Preliminary report.

The Laplacian operator is one of the most important operators studied in the theory of analysis on manifolds. To define a differential operator like the Laplacian on fractals is not possible from the classical viewpoint of analysis. We construct the Laplacian on finitely ramified self-similar fractals, such as the Sierpinski gasket and discuss its spectrum. The decimation method is a process that describes the relationship between the spectrum of the Laplace operator and the dynamics of the iteration of a certain polynomial on $\mathbb{C}$. Furthermore, we discuss the spectral zeta function of the Laplacian. Teplyaev discovered the product structure of the spectral zeta function in the case of Sierpinski gasket that involves a geometric part and a new zeta function of a polynomial induced by the decimation method. An interesting feature of the product structure is the cancellation phenomenon between the poles of the zeta function of a polynomial and the zeros of the geometric part of the spectral zeta function of the Laplacian. Initially, M. Lapidus illustrated a similar product structure for self similar fractal strings. (Received September 11, 2009)