1067-37-2287 **Nishu Lal*** (nishul@math.ucr.edu), Department of Mathematics, University of California, Riverside, 261 Surge Building, Riverside, CA 92521, and **Michel Lapidus** (lapidus@math.ucr.edu), Department of Mathematics, University of California, Riverside, 231 Surge Building, Riverside, CA 92521. *Product structure of the spectral zeta function of the Sturm-Liouville operator on fractals.* Preliminary report.

In this talk, we will discuss the spectral zeta function of a self-similar Sturm-Liouville operator on the half real line and C. Sabot's work on connecting the spectrum of this operator with the iteration of a rational map of several complex variables. The Sturm-Liouville operator on $[0,\infty)$ is viewed as a limit of the sequence of operators $\frac{d}{dm_{<n>}}\frac{d}{dx}$ with Dirichlet boundary condition on $I_{<n>} = [0,\alpha^{-n}]$ which are the infinitesimal generators of the Dirichlet form $(a_{<n>}, m_{<n>})$. In particular, it is defined in terms of a self-similar measure m and Dirichlet form a, relative to a suitable iterated function system (IFS) on $I = [0,1]$. In the case of the Sierpinski gasket, as was shown by A. Teplyaev, extending the known relation by M. Lapidus for fractal strings, the spectral zeta function of the Laplacian has a product structure with respect to the iteration of a rational map on $\mathbb{C}$ which arises from the decimation method. In the case of the above self-similar Sturm-Liouville problem, we obtain an analogous product formula, but now expressed in terms of the (suitably defined) zeta function associated with the dynamics of the corresponding 'renormalization map', viewed as a rational function on $\mathbb{P}^2(\mathbb{C})$. (Received September 22, 2010)