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Alexander Teplyaev* (teplyaev@uconn.edu), Department of Mathematics, University of Connecticut, Storrs, CT 06269-3009. *Derivatives on Fractals*. Preliminary report.

A Laplacian on fractals can be defined either as the generator of a diffusion process (Kusuoka, Barlow, Bass, Perkins, Lindstrom, Kumagai, Hambly et al) or as a re-normalized limit of graph Laplacians (Kigami, Strichartz et al). However, it is less clear how to define first order derivatives (different approaches were introduced earlier by Kusuoka, Kigami, Strichartz and the presenter). In the talk, based on joint work with Michael Hinz, Marius Ionecu, Luke Rogers and Dan Kelleher, I will describe recent progress toward better understanding of the derivatives and related notions of differential and Riemannian geometries on fractals. (Received September 22, 2011)