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Michel L Lapidus* (lapidus@math.ucr.edu), University of California, Department of Mathematics, Riverside, CA 92521-0135, and **Goran Radunovic** and **Darko Zubrinic**. *Zeta functions associated with general compact sets in R^N : Towards a general theory of complex fractal dimensions.*

We define and study a new family of zeta functions associated with general compact sets in Euclidean spaces of any dimension (or in arbitrary measure metric spaces). In this talk, we focus on the Euclidean setting and show, in particular, that the Minkowski dimension of the compact set is equal to the abscissa of convergence of the associated zeta function, thereby extending to higher dimensions a known result for the one-dimensional case (corresponding to fractal strings, see the books by the presenter and M. van Frankenhujsen on this subject). We illustrate the theory by various examples of fractal sets. We also discuss several open problems in this context and the possible consequences of these definitions and results to help develop a general theory of complex fractal dimensions in higher dimensions. (The complex dimensions are defined as the poles of the meromorphic continuation of the zeta function.) For now, possible connections between the present work and the earlier higher-dimensional theory of complex dimensions of fractal sprays and of self-similar tilings developed by the presenter jointly with E. Pearse (as well as with E. Pearse and S. Winter, Adv. in Math., 2011), via tube formulas and the associated tubular zeta functions, remain to be explored. (Received December 05, 2011)