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Differential forms on Dirichlet spaces and analysis on fractals.

We will discuss techniques of defining intrinsic metrics and vector analysis for measurable Dirichlet forms (quadratic forms on scalar functions) and resistance forms. This vector analysis has applications in constructing a Dirac operator and a space of one forms. This construction combines ideas from classical and non-commutative functional analysis. We will discuss the spectral properties of these ideas, as well as how they relate to analytic ideas such as heat kernel estimates and other functional inequalities. (Received February 18, 2015)