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Piecewise harmonic functions, derivations and 1-forms on certain fractals.

We consider how the abstract results of Cipriani and Sauvageot about derivations associated to Dirichlet forms on pcf self-similar fractals may be computed in the case of resistance forms using piecewise harmonic functions, and the consequences for 1-forms, Hodge theory and a type of phase operator. (Received June 29, 2011)