1021-39-111 **Peter J. Grabner*** (peter.grabner@tugraz.at), Department of Mathematics, 1326 Stevenson Center, Nashville, TN 37240. *Poincaré functional equations, eigenvalues of fractal Laplacians, and fractal Zeta functions.*

We prove that the zeta-function ζ_Δ of the Laplacian Δ on a self-similar fractals with spectral decimation admits a meromorphic continuation to the whole complex plane. We characterise the poles, compute their residues, and give expressions for some special values of the zeta-function. Furthermore, we discuss the presence of oscillations in the eigenvalue counting function, thereby answering a question posed by J. Kigami and M. Lapidus for this class of fractals. The main tool for this is the classical Poincaré functional equation. The asymptotic behaviour of its solution mirrors the poles of the zeta-function. (Received August 30, 2006)