Mathematics > Functional Analysis

Exact spectrum of the Laplacian on a domain in the Sierpinski gasket

Hua Qiu

(Submitted on 7 Jun 2012)

For a certain domain Ω in the Sierpinski gasket $\mathcal{SG}$ whose boundary is a line segment, a complete description of the eigenvalues of the Laplacian under the Dirichlet and Neumann boundary conditions is presented. The method developed in this paper is a weak version of the spectral decimation method due to Fukushima and Shima, since for a lot of `"bad" eigenvalues the spectral decimation method can not be used directly. We also prove an analogue of Weyl's classical result on the eigenvalue asymptotics of the eigenvalue counting function $\rho^\Omega(x)$. The ratio $\rho^\Omega(x)/x^{\log3/\log 5}$ is bounded but non-convergent as $x\rightarrow\infty$. Moreover, we explain that the asymptotic expansion of $\rho^\Omega(x)$ admits a second term of the order $\log2/\log 5$, that becomes apparent from the experimental data. This is very analogous to the conjectures of Weyl and Berry.

Comments:	70 pages, 10 figures, 6 tables. arXiv admin note: text overlap with arXiv:0909.1066
Subjects:	**Functional Analysis (math.FA)**
MSC classes:	28A80, 31C99
Cite as:	**arXiv:1206.1381 [math.FA]**
	(or **arXiv:1206.1381v1 [math.FA]** for this version)

Submission history

From: Hua Qiu [view email]
[v1] Thu, 7 Jun 2012 01:22:44 GMT (310kb)

Which authors of this paper are endorsers?