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Spectral properties of pseudodifferential operators on the Sierpinski Gasket

The celebrated Szegö limit theorem states that

$$\lim_{n\to\infty} \frac{1}{n+1} \log\det P_n[f]P_n = \int_0^{2\pi} \log f(\theta)\,\frac{d\theta}{2\pi}$$

where $[f]$ is the operator of multiplication by a positive $C^{1+\alpha}$ function f and P_n is the projection onto the span of $\{e^{ik\theta}, 0 \leq k \leq n\}$ in L^2 of the unit circle. Later generalizations allow more complicated operators than $[f]$.

In joint work with M. Ionescu and K. Okoudjou we consider an analogue of this result on the Sierpinski Gasket in which $[f]$ is replaced by a pseudo-differential operator, the projection is onto the eigenspaces of L^2 with eigenvalues less than Λ and the limit is taken as $\Lambda \to \infty$. For a suitable class of pseudo-differential operators the result gives asymptotics of the operator from its symbol.