A metric graph is a graph where to each edge a length is assigned. The class of rooted metric trees can be thought of as a generalization of, but much richer than, the positive real line $\mathbb{R}_+$. The goal of this paper is to study spectral asymptotics on such trees. In particular, the authors study the asymptotics of the eigenvalue problem $-\lambda \Delta u = Vu, \ u(\sigma) = 0$, where $V$ is a non-negative function on the metric tree $\Gamma$, and $\sigma$ is the root of $\Gamma$.

The authors give sharp asymptotics for the eigenvalues in terms of the potential $V$ and the metric structure of the graph $\Gamma$. Their results are particularly sharp when $\Gamma$ is a regular tree (where all vertices of the same generation have the same branching number, and all edges of the same generation have the same length) and $V$ depends only on the length from the root. In this case, the authors give examples where the asymptotics of the eigenvalues do not obey a Weyl law.

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References


Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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