

Self-adjoint extensions of infinite quantum graphs

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In the last decades, quantum graphs (Laplacians on metric graphs) have become popular objects of study and the analysis of spectral properties relies on the self-adjointness of the Laplacian. Whereas on finite metric graphs the Kirchhoff Laplacian is always self-adjoint, much less is known about the self-adjointness problem for graphs having infinitely many edges and vertices. Intuitively the question is closely related to finding appropriate boundary notions for infinite graphs.

In this talk we study the connection between self-adjoint extensions and the notion of graph ends, a classical graph boundary introduced independently by Freudenthal and Halin. Our discussion includes a lower estimate on the deficiency indices of the minimal Kirchhoff Laplacian and a geometric characterization of self-adjointness of the Gaffney Laplacian.

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