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Title: An inverse spectral problem on general quantum graphs

Abstract: Consider a quantum graph consisting of a ring with two attached edges, and assume Kirchhoff–Neumann conditions hold at the internal vertices. Associated with this graph is a Schrödinger-type operator $L = -\Delta + q(x)$ with Dirichlet boundary conditions at the two boundary nodes. Let $\{\omega_n^2, \phi_n(x)\}$ be the eigenvalues and associated normalized eigenfunctions. Let v_1 be a boundary vertex, and v_2 the adjacent internal vertex. Assume we know the following data: $\{\omega_n^2, \partial_x\phi_n(v_1), \partial_x\phi_n(v_2)\}$. Here, $\partial_x\phi_n(v_2)$ refers to an outward normal derivative at v_2 along one of the edges incident to the other internal vertex. From this data, we determine the following unknown quantities: the lengths of edges and the potential functions on each edge. We then indicate how this method can be extended to general quantum graphs.