

# Quantum Graphs

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A metric graph is a graph with edges treated as line segments of certain length. A function on a metric graph is a collection of functions defined on edges. One can define differential operators acting on functions. A quantum graph is a metric graph, together with a differential operator defined on it. Historically, quantum graphs first arose in chemistry. Ruedenberg and Scherr used them in 1953 to model the naphthalene molecule. Recently, the interest in quantum graphs was stimulated by nano-technology and mesoscopic physics. Mathematically, a quantum graph is a very interesting object. On one hand it is a one-dimensional object; on the other hand it exhibits the behavior in higher dimensions. Currently, quantum graphs is an active area of research, and there are many exciting open problems in the field.