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Recursive Algorithms Solving Inverse Scattering Problems on Quantum Graphs NINA AVDONINA, SERGEI AVDONIN, University of Alaska Fairbanks — Here we describe a new approach to solving inverse scattering problems on quantum graphs. Our approach is based on the Boundary Control method and combines spectral, dynamical and scattering approaches to inverse problems. The Schrodinger equations with short–range potentials are considered on the edges of the graph. We use connections between the scattering matrix, Titchmarsh–Weyl matrix and response operator. Since the number of edges of graphs arising in applications is typically very big, we propose a recursive procedure which may serve as a base for developing effective numerical algorithms. For trees (graphs without cycles), this procedure allows recalculating efficiently the inverse data from the original tree to the smaller trees, 'removing' leaves step by step up to the rooted edge. We solve the inverse problem of recovering not only the physical properties, i.e. the lengths of the edges and corresponding potentials, but also the topology of the tree.

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