COLOQUIO DE ANÁLISIS Y FÍSICA–MATEMÁTICA

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INVERSE PROBLEM WITH TRANSMISSION EIGENVALUES FOR THE DISCRETE SCHRÖDINGER EQUATION

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Abstract

The discrete Schrödinger equation with the Dirichlet boundary condition is considered on a half-line lattice when the potential is real valued and compactly supported. The inverse problem of recovery of the potential from the corresponding transmission eigenvalues is analyzed. The Marchenko method and the Gel'fand-Levitan method are used to solve the inverse problem uniquely, except in one "unusual" case where the sum of the transmission eigenvalues is equal to a certain integer related to the support of the potential.

It is shown that in the unusual case there may be a unique solution corresponding to a given set of transmission eigenvalues, there may be a finite number of distinct potentials for a given set of transmission eigenvalues, or there may be infinitely many potentials for a given set of transmission eigenvalues.

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