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Spectral Analysis of Certain Schrodinger Operators

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The J -matrix method is extended to difference and q -difference operators and is applied to several explicit differential, difference, q -difference and second order type operators. The spectrum and the spectral measures are discussed in each case and the corresponding eigenfunction expansion is written down explicitly in most cases. In some cases we encounter new orthogonal polynomials with explicit three recurrence relations where nothing is known about their explicit representations or orthogonality measures. Each model we analyze is a discrete quantum mechanical model in the sense of Odake and Sasaki. This is joint work with Erik Koelink.