ANALYTIC SCATTERING THEORY FOR JACOBI OPERATORS AND BERNSTEIN-SZEGÖ ASYMPTOTICS OF ORTHOGONAL POLYNOMIALS

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Abstract. We study semi-infinite Jacobi matrices $H = H_0 + V$ corresponding to trace class perturbations V of the "free" discrete Schrödinger operator H_0 and properties of the associated orthonormal polynomials $P_n(z)$. Our goal is to construct various spectral quantities of the operator H, such as the weight function, eigenfunctions of its continuous spectrum, the wave operators for the pair H_0, H, the scattering matrix, the spectral shift function, etc. This allows us to find the asymptotic behavior of the polynomials $P_n(z)$ as $n \to \infty$ and gives a new look on the Bernstein-Szegö formulas. We give a proof of these formulas under essentially more general circumstances than in the original papers.