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Natural Boundaries and Spectral Theory

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Abstract. This talk describes joint work with Jonathan Breuer. The last ten years has seen considerable understanding of the spectrum of general Jacobi matrices in terms of its right limits due to work of Last–Simon and especially Remling. We have discovered that analogs of these ideas can be used to understand when a power series (with bounded Taylor coefficients) has a natural boundary on the unit circle. One recovers and (within the class of bounded coefficients) improves many classical results. The main theorem depends on little more than the notions of right limit and reflectionless double power series (that we carry over from the theory of Jacobi matrices) and a clever lemma proven by M. Riesz in 1916 (using the maximum principle). This will be a colloquium-level talk that should be accessible to anyone with a good complex variables course.