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Short title: Spectral singularities for non-Hermitian one-dimensional Hamiltonians: puzzles with resolution of identity.

MR Number: 2666950

Primary classification: 81Q12

Secondary classification(s): 34L10 34L40 47A10 47E05 47N50

Review text:

Eleven pages of text (mainly formulae) and eleven pages of appendices (proofs) are devoted to the rigorous formulation of the biorthogonality and completeness of wave functions generated by complex potentials admitting the presence of the so called spectral singularities in the scattering dynamical regime.

The key result lies in the consistent incorporation of wave functions related to spectral singularities into standard biorthogonality and completeness formulae. The authors point out that one of the most characteristic features of such a type of result lies in the explicit relationship between the formulae and the choice of the class of the test functions. Although the study itself is restricted to a few sample Hamiltonians, similar projects only started appearing in very recent literature [pars pro toto let me mention paper “Krein Spaces in de Sitter Quantum Theories” by J.-P. Gazeau, P. Siegl and A. Youssef, SIGMA 6 (2010), item 011 (arXiv:1001.4810)].