EQUIVALENCE BETWEEN THE COMPLEX ROTATION RESONANCES AND SCATTERING MATRIX RESONANCES

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We work on a multichannel scattering problem with binary channels and a three-body problem with pairwise interactions. The associated Hamiltonians are written in the momentum representation and become a subject to the complex deformation. The well-familiar complex scaling is a particular case of such a deformation. Isolated non-real eigenvalues of the complexly deformed Hamiltonians are called the complex rotation resonances. For a class of rapidly decreasing and momentum-space analytic interactions, we prove that the complex rotation resonances do coincide with the scattering matrix resonances, that is, with the poles of the scattering matrix analytically continued on the respective unphysical sheet. Our proofs employ the explicit representations [1, 2] that express the *T*- and *S*-matrices on unphysical energy sheets through the values of those same matrices taken exclusively on the physical sheet. Our proofs seem to be more transparent than the ones found in the literature (see [3] and references therein). To make the underlying idea maximally clear, we first present the proofs found in [4] for the simplest case – the Friedrichs-Faddeev model [5].

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