

Eigenvectors of multi-channel scattering matrices at resonance energies

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We begin by recalling the formulas [1,2] which express the multi-channel T - and S -matrices on unphysical energy sheets through those same matrices taken only in the physical sheet. The explicit representations for the unphysical-sheet T - and S -matrices imply that a resonance on an unphysical energy sheet is the (complex) energy value where the appropriately truncated scattering matrix on the physical sheet has eigenvalue zero. We show that the channel components of the eigenvector of the truncated scattering matrix belonging to its zero eigenvalue make sense of breakup amplitudes for the corresponding resonance state. In the case of a multi-channel problem with purely binary channels this statement has been already proven in [2]. Now we want to extend this result to the truncated three-body scattering matrices responsible for resonances on the two-cluster three-body unphysical sheets.

- [1] A. K. Motovilov, *Representations for the three-body T -matrix, scattering matrices and resolvent in unphysical energy sheets*, Math. Nachr. **187** (1997), 147–210.
- [2] A. K. Motovilov, *Eigenvectors of multichannel scattering matrix at resonance energy values*, Phys. Atom. Nucl. **77**:4 (2014), 453–462.