Title: Solution of integral equations for separable interactions

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Abstract: This work deals with the most fundamental types of integral equations (Fredholm and Volterra). Their occurrence in quantum mechanics is illustrated and the process that leads to the so-called regular and Jost solution is presented. Further their solutions in the case of separable interactions are studied. Analytical solutions on model separable potentials are sought. Analytical extensions of these solutions to the complex energy plane are provided and the properties of these functions are examined. The method of analytical continuation in the coupling constant based on the extension of the coupling constant λ as a function of κ is introduced. For some examples of separable potentials the Taylor expansion of the function $\lambda(\kappa)$ and from it the inverse series $\kappa(\sqrt{\lambda - \lambda_0})$ are calculated. These series are then used to determine the resonance parameters of the potential and the accuracy of these calculations is discussed.

Key words: integral equations, scattering theory, resonances, separable potential