Turkish Journal of Physics

@

phys@tubitak.gov.tr

The Asymptotic Iteration Method for the Eigenenergies of the Complex Potential V(x) = γ x^4 + i β x^3 + i α x

Abdallah Jamiel SOUS
Department of Mathematics, Al-Quds Open University Nablus, P. O. Box 893, PALESTINE
e-mail: melhem_fan@hotmail.com

Abstract: Recently, three complex potentials $V(x) = i\, x^3$, $V(x) = i\, x^3 + i\, \alpha\, x$, and $V(x) = x^4 + i\, \alpha\, x$ have been studied in the literature. Here, we combine these potentials in one. With the aid of the asymptotic iteration method we have numerically calculated the eigenenergies of the new complex potential. The obtained numerical results are compared with those obtained by using the WKB, EMM, and MRF methods and found to be in an excellent agreement. We discuss how an adjustable parameter ζ can help to improve our results.

Key Words: on-Hermitian potential, Schrödinger equation, the asymptotic iteration method, an adjustable parameters