



Iranian Journal of Physics Research, Vol. 22, No. 4, 2023
DOI: 10.47176/ijpr.22.4.91310

Numerical approach by quasi-spectral and fitting methods to study Schrodinger equation and calculating the energy levels of flat potentials

V Mirzaei Mahmoudabadi*

Faculty of Physics, Shahid Bahonar University of Kerman,
Kerman, Iran

E-mail: vah_mirzaei@uk.ac.ir

(Received 6 September 2021 ; in final form 27 July 2022)

Abstract

In this paper, flat potentials ($\mu | x / a | N$) are numerically investigated by pseudo-spectral method. The Schrodinger equation of this type of potential has become an eigen system using the pseudo-spectral method. The eigen system is then diagonalized by the Jacobi method. Energy eigen values for different N s have been compared with similar articles. The limit behavior of this potential for the states $N = 2$ and $N \rightarrow \infty$ is related to the harmonic oscillator and the particle in the box with length $2a$, respectively. For each N , a function is proposed for energy eigen values in terms of the quantum number n . By using of data fitting, the correctness of the proposed equation is checked.

Keywords: pseudo-spectral method, flat potentials, energy eigen values, Jacobi method

For full article, refer to the Persian section