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## 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

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### 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

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