



## Calculating modes of quantum wire systems using a finite difference technique

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### Abstract

In this paper, the Schrodinger equation for a quantum wire is solved using a finite difference approach. A new aspect in this work is plotting wave function on cross section of rectangular cross-sectional wire in two dimensions, periodically. It is found that the correct eigen energies occur when wave functions have a complete symmetry. If the value of eigen energy has a small increase or decrease in neighborhood of the correct energy the symmetry will be destroyed and aperturbation value at the first of wave function will be observed. In addition, the demand on computer memory varies linearly with the size of the system under investigation.

**Keywords:** quantum wire, finite difference, sparse matrices, Energy levels

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