

Homework Assignment for the PCPBT Tool: Cosine Bands

**Gerhard Klimeck and Dragica Vasileska
(Purdue, ASU)**

Run the PCPBT tool and select the option 'n potential barriers with same length'. Use the default values for the barrier height and the width of the well and the barrier region. Assume 10, 15, 20 and 25 wells and for each of the four cases plot 'Resonance peaks vs. occurrence/well' separately and on the same plot which you can accomplish by clicking on the 'All' button at the bottom left.

- Comment on the nature of the energy band structure and explain the appearance of the cosine band structure. Connect this to the lattice constant that equals the periodicity of the wells
- Vary the width of the barriers and comment on the nature of the bands. Under what conditions we get almost free particle dispersion?