Drawing Wavefuncions in Linear Wells

Problem Solving Outline and Example
Center for Academic Program Support

A. Basic Outline for Sketching Wavefunctions

- Draw the potential $U(x)$.
- Draw the energy E.
- Draw a *sine*-like function with $n-1$ nodes. Remember that for the function $\Psi(x) = A\sin(\frac{2\pi x}{\lambda})$ the amplitude A and the wavelength λ *increase* with *increasing* $U(x)$.
- Remember that if $U(x) \to \infty$ then $\Psi(x) \to 0$.
- $\Psi(x)$ decays exponentially in a forbiden region, where $E < U(x)$. The decay rate is slower for "less forbiden" regions.

B. Some Examples

Sketch the $n = 5, 6$ and 7 wave funtions in the following potentials for the indicated energies.

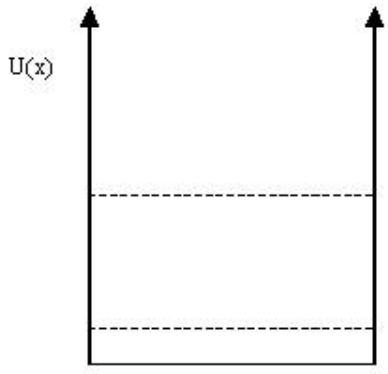

FIG. 1: Our old friend the infinite square well.

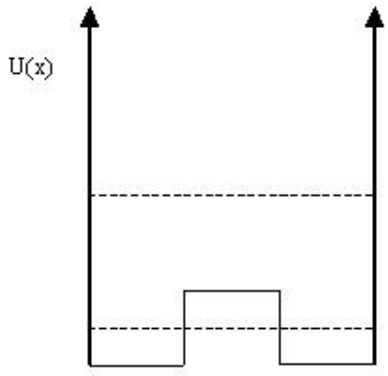

FIG. 2: An infinite well with a bump.