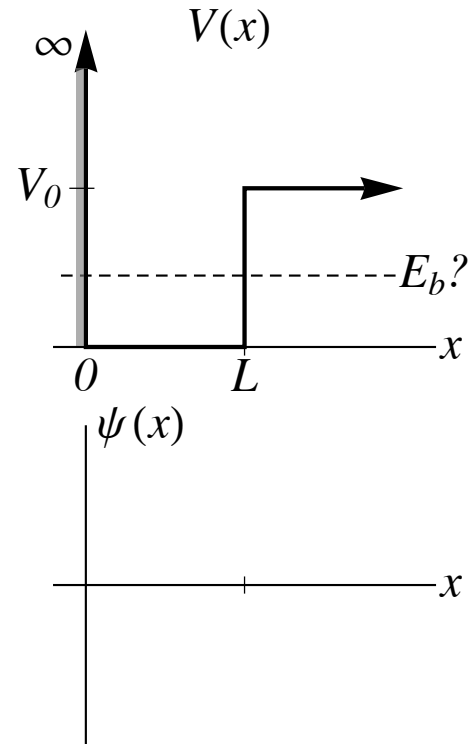


I: Scattering**A. Half-Infinite Square Well**

Consider the potential shown at the right where the potential is infinite for $x < 0$, zero in the region, $0 \leq x < L$ and V_0 in the region $x \geq L$.

1. Are there any bound states for this well? How can you tell and how many are there?



2. On the graph to the right, assume that there is at least one bound state and sketch that state, including all the relevant properties.

Now, consider the case where $E > V_0$:

3. Are there any states for this energy range? How many?

4. For any allowable energy in this range, what is the general solution of the time independent Schrödinger equation?

5. Imagine that the solution to part 4 represents a particle coming in from the right and scattering off the well. What is the transmission coefficient at $x = L$? Is this surprising?