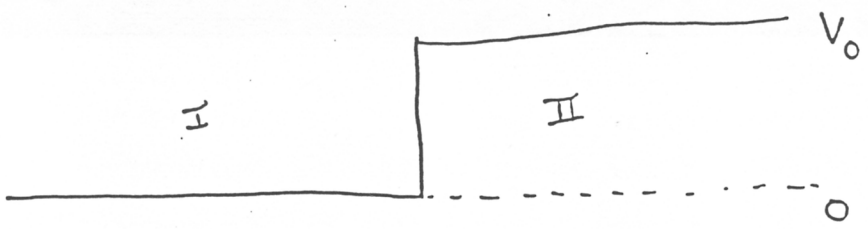
(1) Consider the barrier for the case $E > V_0$



(a) Consider first the case of a particle incident from the left. It (the wave packet) will be partly reflected and partly transmitted by the step. To discuss this case we desire a solution which in the right hand region describes a wave traveling to the right. Find this solution everywhere, and derive an expression for the reflection coefficient R, the probability R that the particle is reflected. The transmission coefficient is $T = 1 - R$.

Hint: The wave function on the right has the form $\psi_{right} = Ae^{ikx} + Be^{-ikx}$ Find the required function on the left. Use boundary conditions (continuity of wavefunction and its first derivative) to solve for the probability that a wave is reflected. The incident wave can have unity amplitude (1). You need to find the amplitude of the reflected and transmitted waves. The probability of reflection (R) is then the square of the reflected wavefunction.

Find R and T in terms of the wavevector (k) on each side of the barrier (k_I and k_{II}). Plot both the wavefunction and the probability density

(b) Consider next the case of a particle incident from the right. Find a solution of the Schrödinger equation with only a transmitted particle on the left. Find the reflection coefficient R' in terms of K_I & K_{II}. What is $T' = 1 - R'$? What is the relation between R' & R?

CUPS: Stationary States, Potential: Step | Compute Wavefunction (com
Set energy = 0.75 & 1.25)