

## Numerical Solutions for Schrodinger's Equation for the Particle in the Slanted Box

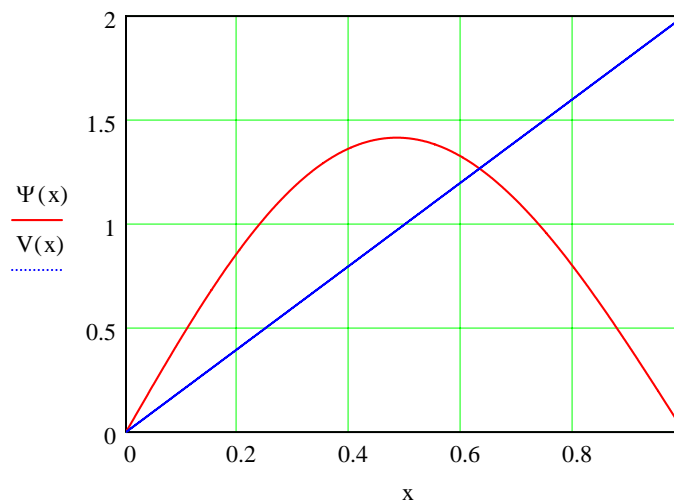
Parameters go here:  $x_{\max} := 1$     $\mu := 1$     $V_0 := 2$

Potential energy  $V(x) := V_0 \cdot x$

Given  $\frac{-1}{2 \cdot \mu} \cdot \frac{d^2}{dx^2} \Psi(x) + V(x) \cdot \Psi(x) = E \cdot \Psi(x)$     $\Psi(0) = 0$     $\Psi'(0) = 0.1$

$\Psi := \text{Odesolve}(x, x_{\max})$    **Normalize wavefunction:**    $\Psi(x) := \frac{\Psi(x)}{\sqrt{\int_0^{x_{\max}} \Psi(x)^2 dx}}$

Enter energy guess:  $E \equiv 5.925$



Calculate most probable position:  $x := .5$    Given  $\frac{d}{dx} \Psi(x) = 0$    Find(x) = 0.485

Calculate average position:  $X_{\text{avg}} := \int_0^1 \Psi(x) \cdot x \cdot \Psi(x) dx$     $X_{\text{avg}} = 0.491$

Calculate potential and kinetic energy:  $V_{\text{avg}} := V_0 \cdot X_{\text{avg}}$     $V_{\text{avg}} = 0.983$

$T_{\text{avg}} := E - V_{\text{avg}}$     $T_{\text{avg}} = 4.942$