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

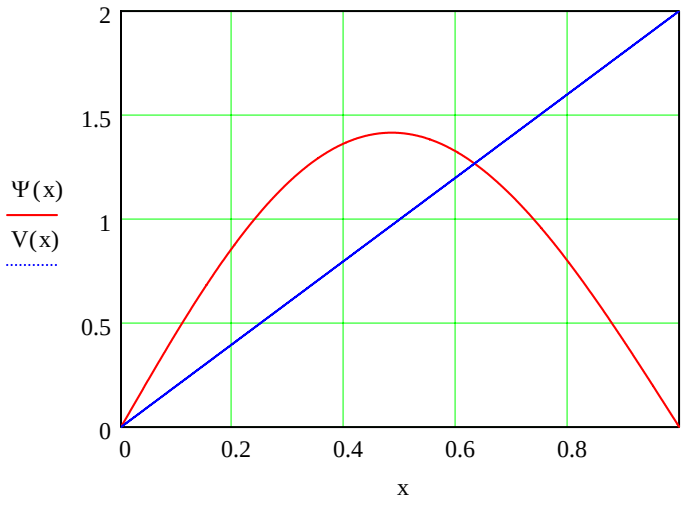
Parameters go here: $x_{max} := 1 \quad \mu := 1 \quad V_0 := 2$

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

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

$\Psi := \text{Odesolve}(x, x_{max})$ 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: $X_{avg} := \int_0^1 \Psi(x)\cdot x\cdot\Psi(x)\, dx \quad X_{avg} = 0.491$

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

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