

Numerical Solutions for Schrodinger's Equation

Integration limit: $x_{\max} := 1$ Effective mass: $\mu := 1$

Potential energy: $V(x) := 0$

Numerical integration of Schrodinger's equation:

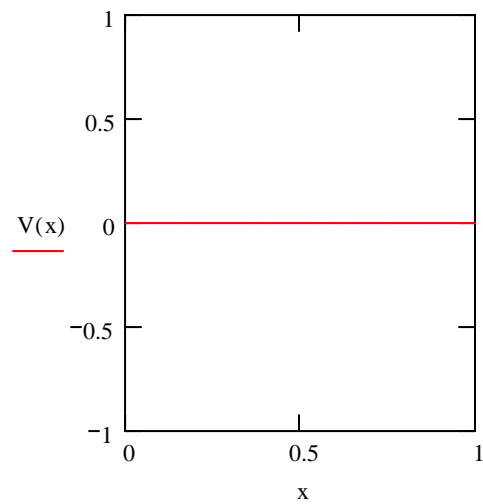
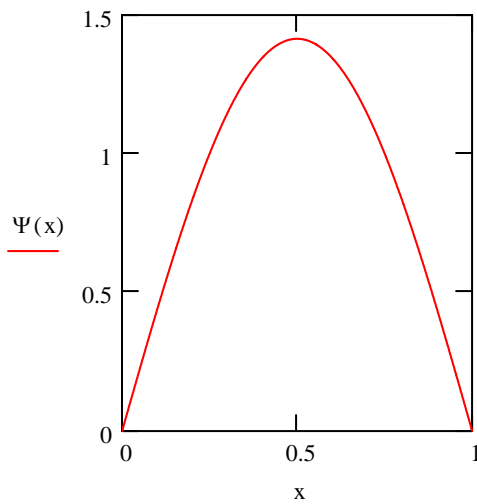
Given
$$\frac{-1}{2 \cdot \mu} \cdot \frac{d^2}{dx^2} \Psi(x) + V(x) \cdot \Psi(x) = E \cdot \Psi(x) \quad \Psi(0) = 0 \quad \Psi'(0) = 0.1$$

$\Psi := \text{Odesolve}(x, x_{\max})$

Normalize wave function:

$$\Psi(x) := \frac{\Psi(x)}{\sqrt{\int_0^{x_{\max}} \Psi(x)^2 dx}}$$

Enter energy guess: $E \equiv 4.934$



Fourier transform coordinate wave function into momentum space.

$p := -20, -19.5 .. 20$ $\Phi(p) := \frac{1}{\sqrt{2 \cdot \pi}} \cdot \int_0^{x_{\max}} \exp(-i \cdot p \cdot x) \cdot \Psi(x) dx$

