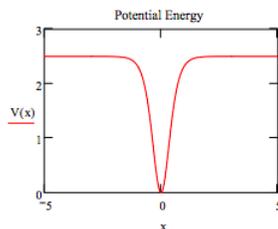


10.34: Numerical Solution for the Feshbach Potential

Parameters go here: $x_{\max} = 5$ $m = 1$ $V_0 = 2.5$ $\mu = 0$ $d = .5$

Potential energy:

$$V(x) = V_0 \tanh\left(\frac{x}{d}\right)^2$$



Given:

$$-\frac{1}{2m} \left(\frac{d^2}{dx^2} \psi(x) \right) + V(x) \psi(x) = E \psi(x)$$

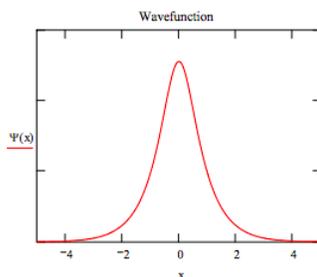
$$\psi(-x_{\max}) = 0 \quad \psi(x_{\max}) = 0.1$$

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

Normalize wavefunction:

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

Enter energy guess: $E = 1.44949$



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