Character of the Quantum Harmonic Oscillator Solutions

Classically-Allowed vs. Classically-Forbidden Regions

In the classically *allowed* region, $-A < x < A$, the Schrodinger equation can be written as $\frac{d^2\psi(x)}{dx^2} = -\frac{2m}{\hbar^2}(E - V(x))\psi(x)$

since $E > V(x)$ there the prefactor of $\psi(x)$ on the right hand side is negative

The wavefunction curves *towards* the axis

In the classically *forbidden* region, $x > A, x < -A$, since $E < V(x)$ there the prefactor of $\psi(x)$ on the right hand side is positive

The wavefunction curves *away from* the axis