

[mex5] Periodic motion in quadratic and quartic potentials

Use the expression

$$T = 2 \int_{x_{min}}^{x_{max}} \frac{dx}{\sqrt{2[E - V(x)]/m}}$$

to calculate the dependence on the amplitude x_{max} of the period T for the motion of a particle with mass m moving

(a) in the quadratic potential $V_2(x) = \frac{1}{2}m\omega_0^2x^2$,

(b) in the quartic potential $V_4(x) = \frac{1}{4}\alpha x^4$.

Solution: