Lecture #16  10-12-2007

Parametric Resonance

\[ \frac{d^2 x}{dt^2} + \omega_0^2 (1 + h \cos (2\omega_0 + \epsilon) t) = 0 \]

For diverging solution for \( |\epsilon| < \frac{\omega_0 h}{2} \)

\[ m \frac{d^2 x}{dt^2} + \frac{1}{2} m \omega_0^2 x^2 + \frac{1}{8} \epsilon x^4 = 0 \]

\( x = x_0(t) + \epsilon x_1(t) + \epsilon^2 x_2(t) + \ldots \)

\( x(0) = 0 \quad x'(0) = 0 \quad x''(0) = 0 \quad \text{for } \epsilon = 0 \)

\[ \theta(\epsilon) \quad \theta' = -\omega_0^2 x_0 \]

\[ \theta'' = -\omega_0^2 x_1 - x_0^3 \]

Improved p.d.l.

VI a) Rotation

1) Rotations in the plane