DAMPED AND FORCED OSCILLATIONS
MIC Physics – Unit I / MIC II Physics – Unit I

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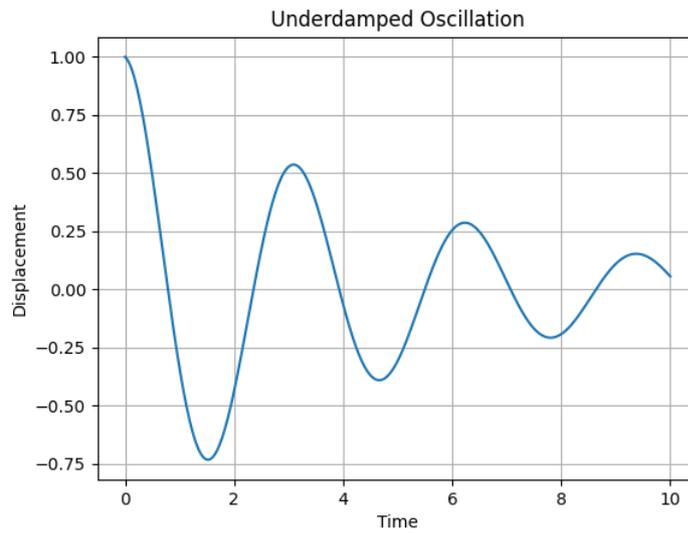(V.K.S.U., Bihar)

Damped Oscillations

Damped oscillations are oscillations in which the amplitude decreases with time due to resistive forces such as friction or viscosity. The differential equation is:

m d²x/dt² + b dx/dt + kx = 0
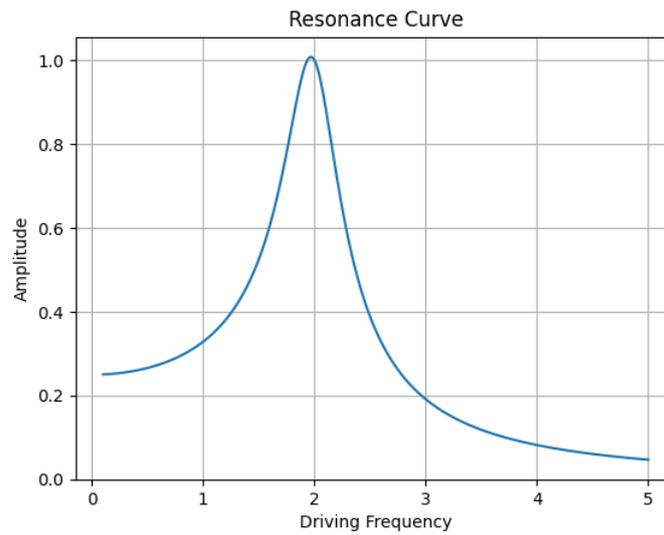
Neat labeled diagram: Underdamped Oscillation

Forced Oscillations

When an external periodic force acts on a system, the oscillations produced are called forced oscillations. The equation of motion is:

$$m \frac{d^2x}{dt^2} + b \frac{dx}{dt} + kx = F_■ \sin(\omega t)$$

Neat labeled diagram: Resonance Curve

Resonance Curve

Conclusion: Damped and forced oscillations explain real physical systems where energy loss and external driving forces are present. Resonance plays a vital role in mechanical and electrical systems.