

Lecture 4.

Lecture objectives.

- To revise the derivation of the damped SHM solution for displacement.
- To be familiar with the solutions corresponding to “heavy damping” and “moderate damping” [cases i) and ii)]. Actual derivation not essential.
- To be very familiar with the solution corresponding to “light damping”. Knowledge of this derivation is required.
- To know why the frequency of a damped oscillator is different to that of an undamped oscillator.
- To understand the concept of logarithmic decrement and decay of energy.

Post-lecture tasks.

1. Define the logarithmic decrement and derive an appropriate equation for it.
2. Write down all the basic wave-related equations you can find. Then learn them and practice making sure that they are dimensionally correct.
3. For a damped SHM system, in which a mass of 1.4kg is oscillating attached to a spring of k-constant 600N/m, under a damping coefficient of 10kg/s, calculate the resonant frequency in Hertz.