Simple Harmonic Motion

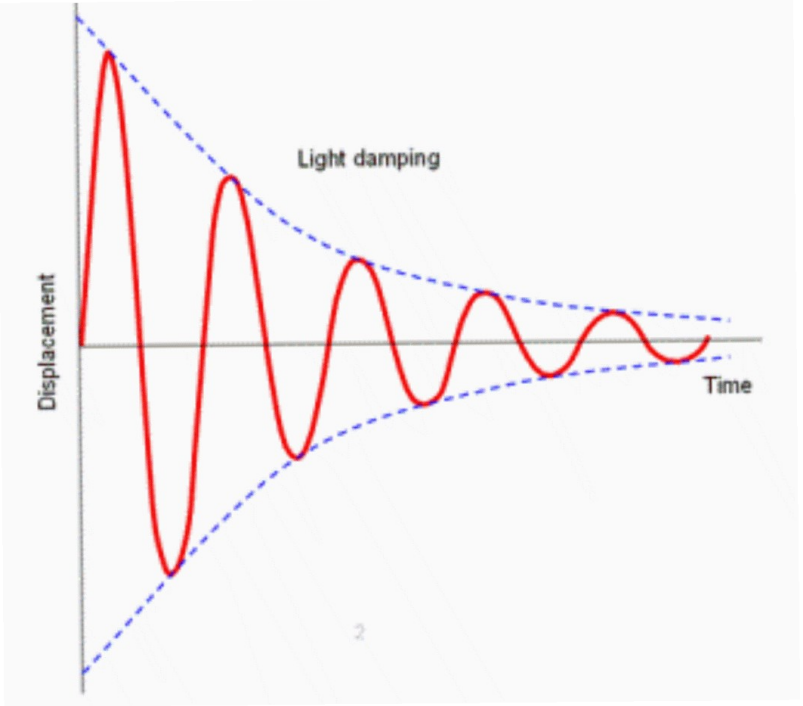
- Simple harmonic motion is a motion that repeats with time: $x(t) = A\cos(\omega t + \phi)$
- Mass on a spring: $\omega = \sqrt{\frac{k}{m}}$
- Simple pendulum: $\omega = \sqrt{\frac{g}{L}}$
  - Also, usually measure position as angle θ(t)

Damped Harmonic Motion

- If there is an external force removing energy from system, amplitude will go down with time
- If external force proportional to velocity (F = -bv): $x(t) = A e^{-bt/2m} \cos(\omega t + \phi)$

Current amplitude

Original amplitude



Accelerating Reference Frames (Hint on Pendulum Problems)

- Some problems this homework deal with accelerating reference frames
- We said Newton's 2nd only works in non-accelerating frames
- Fix: extra fictitious force to make equations work
- How it changes things for this HW:
  - Instead of weight of objects being mg, treat force of gravity as $m(\vec{g}-\vec{a}_{sys})$
    - So in equations derived with g, use magnitude of $\vec{g}-\vec{a}_{sys}$ instead