Adda247

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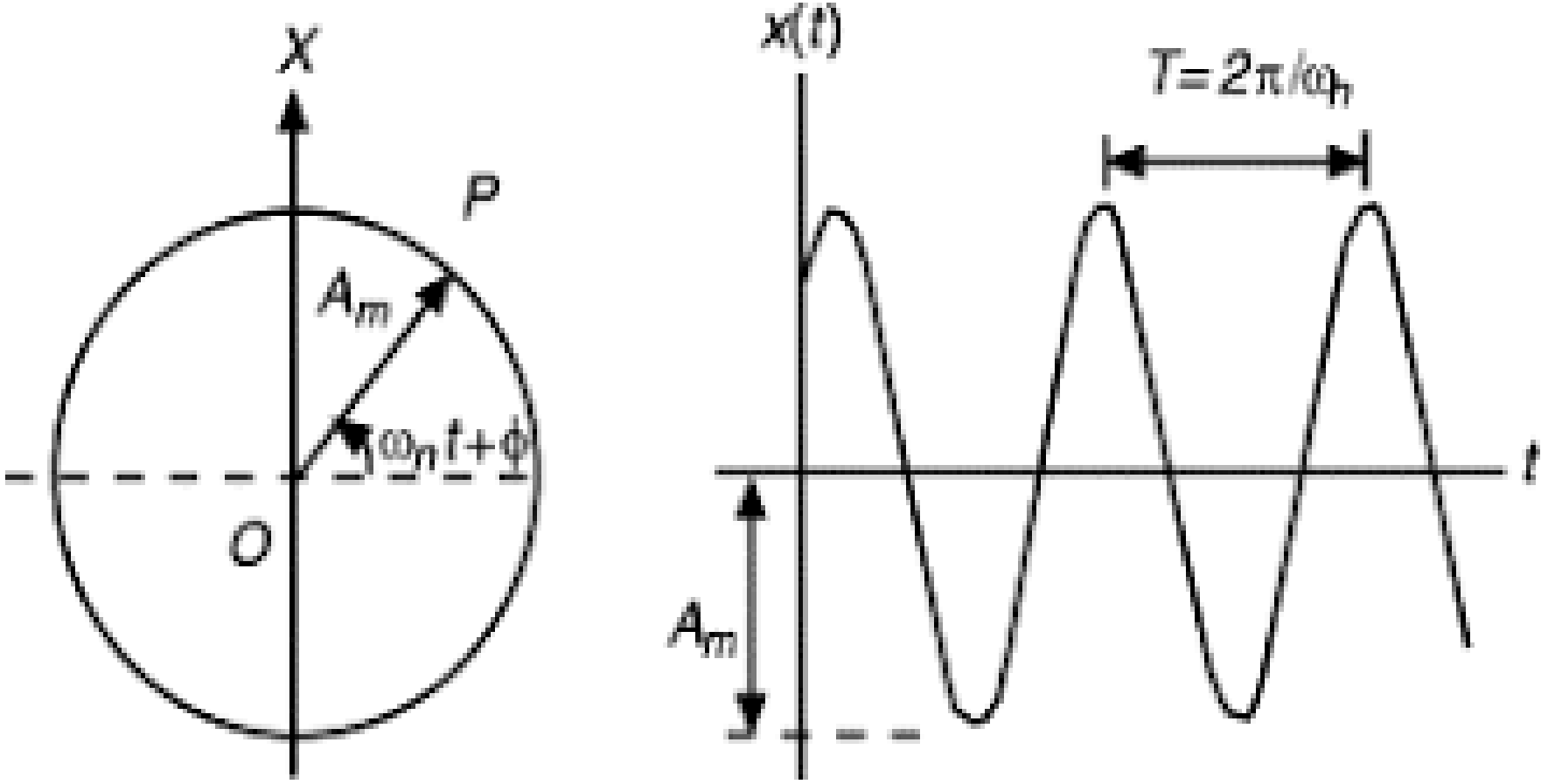
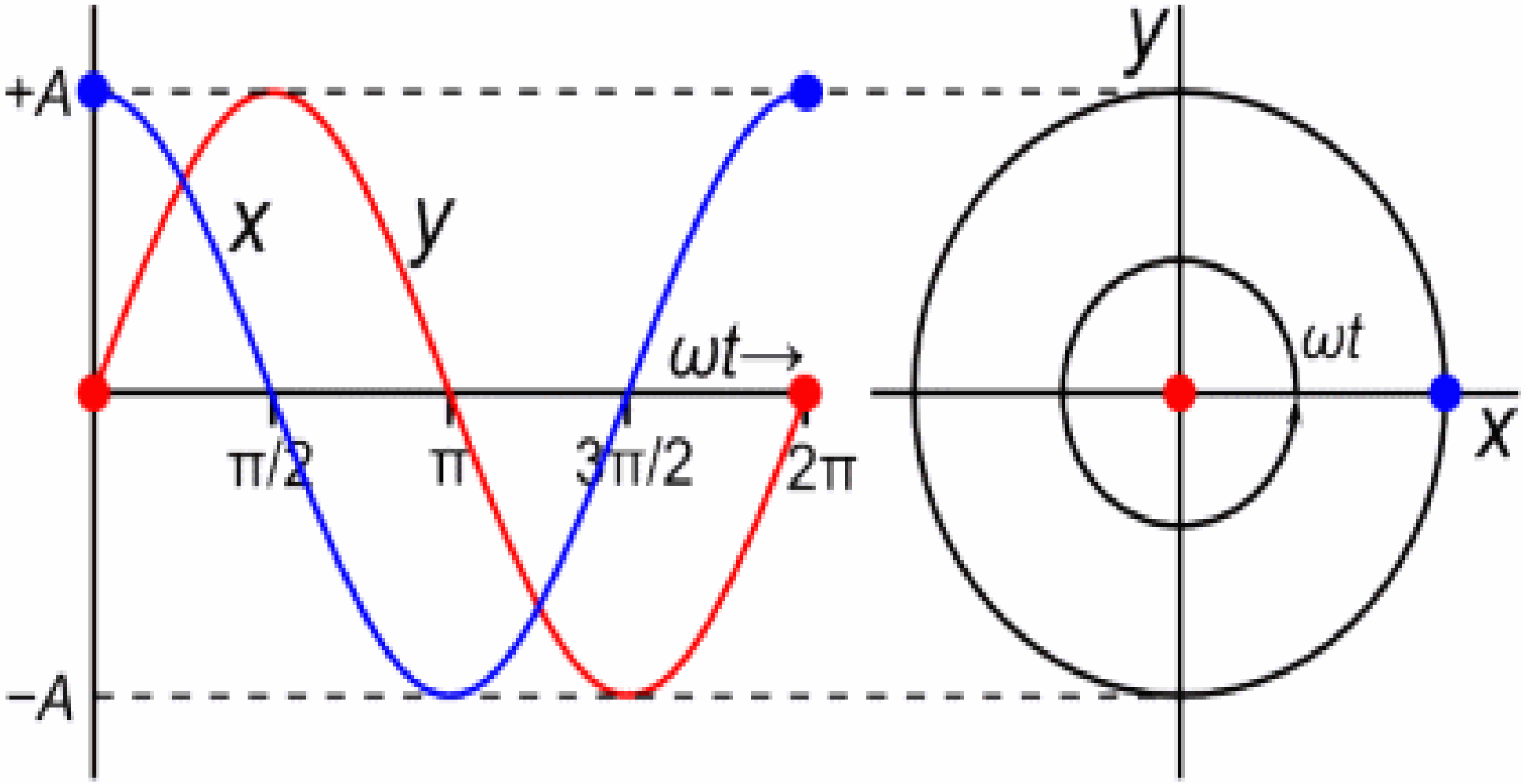
"If there is no struggle, there is no progress."—
Frederick Douglass

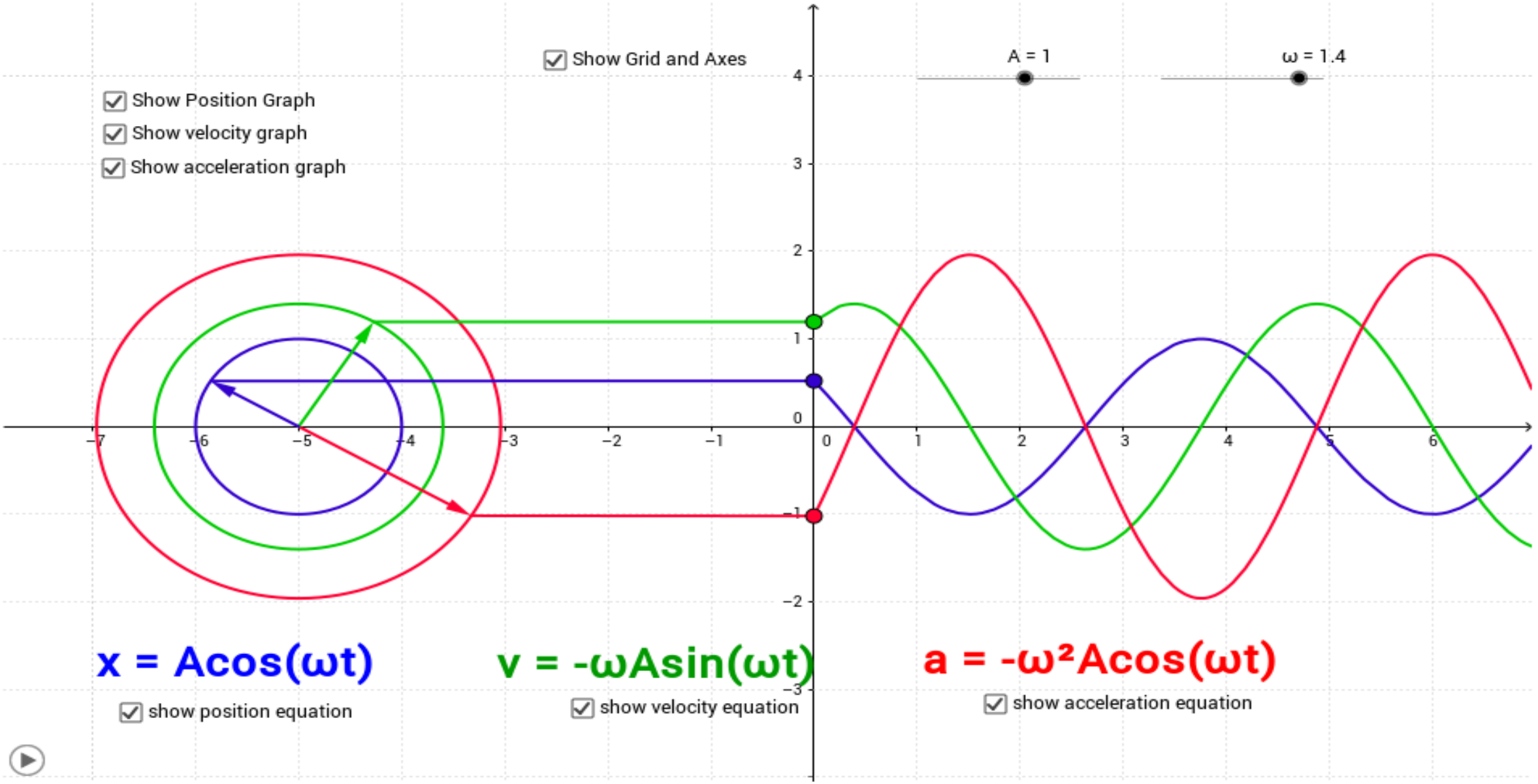
Index :-

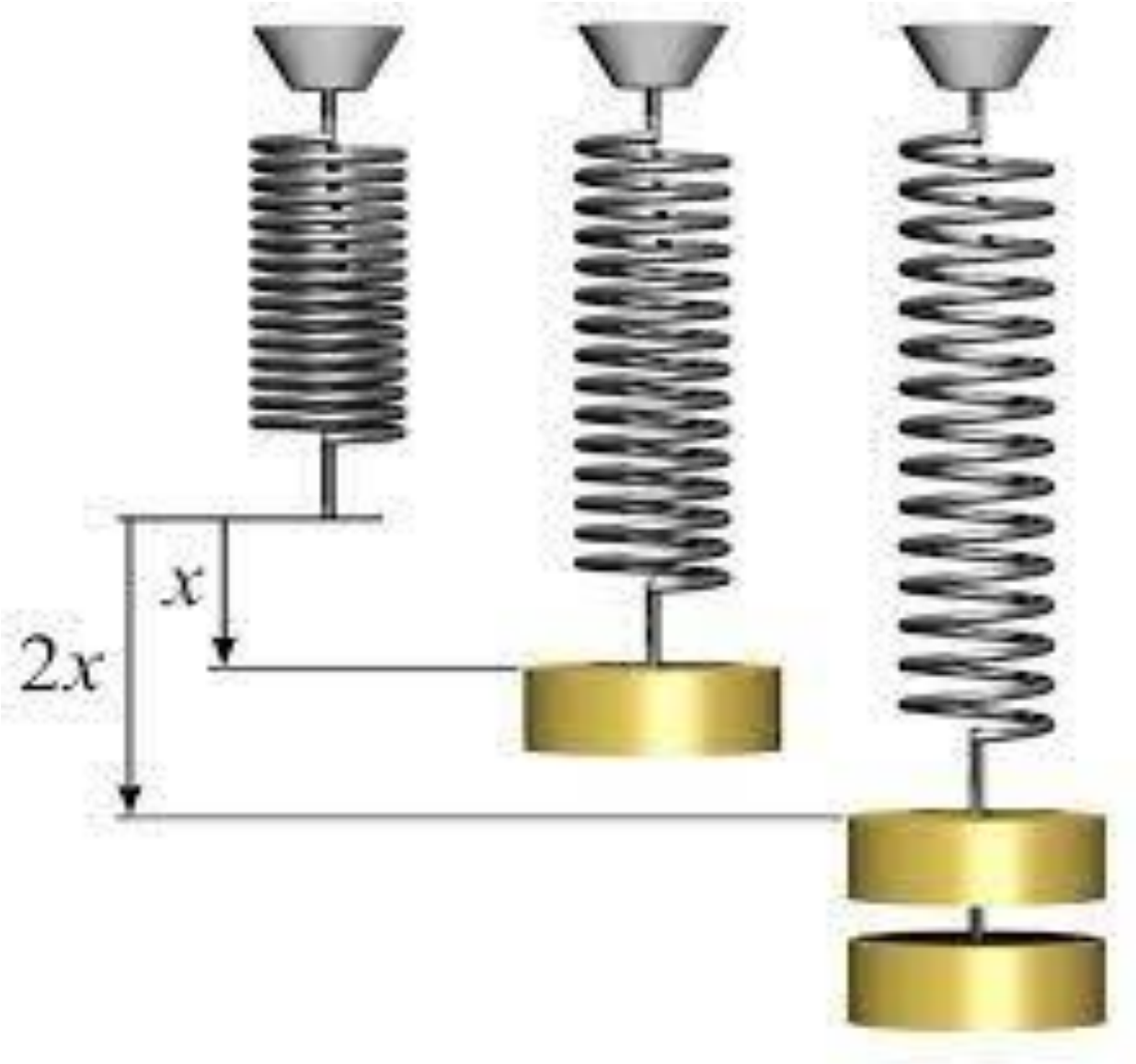
TOM – Theory of Machine

1-2 marks from these Topic









Springs and SHM

- **Attach an object of mass m to the end of a spring, pull it out to a distance A, and let it go from rest. The object will then undergo simple harmonic motion:**

$$x(t) = A\cos(\omega t)$$

$$v(t) = -A\omega\sin(\omega t)$$

$$a(t) = -A\omega^2\cos(\omega t)$$

- **What is the angular frequency in this case?**
  - **Use Newton's 2nd law, together with Hooke's law, and the above description of the acceleration to find:**

$$\omega = \sqrt{\frac{k}{m}}$$

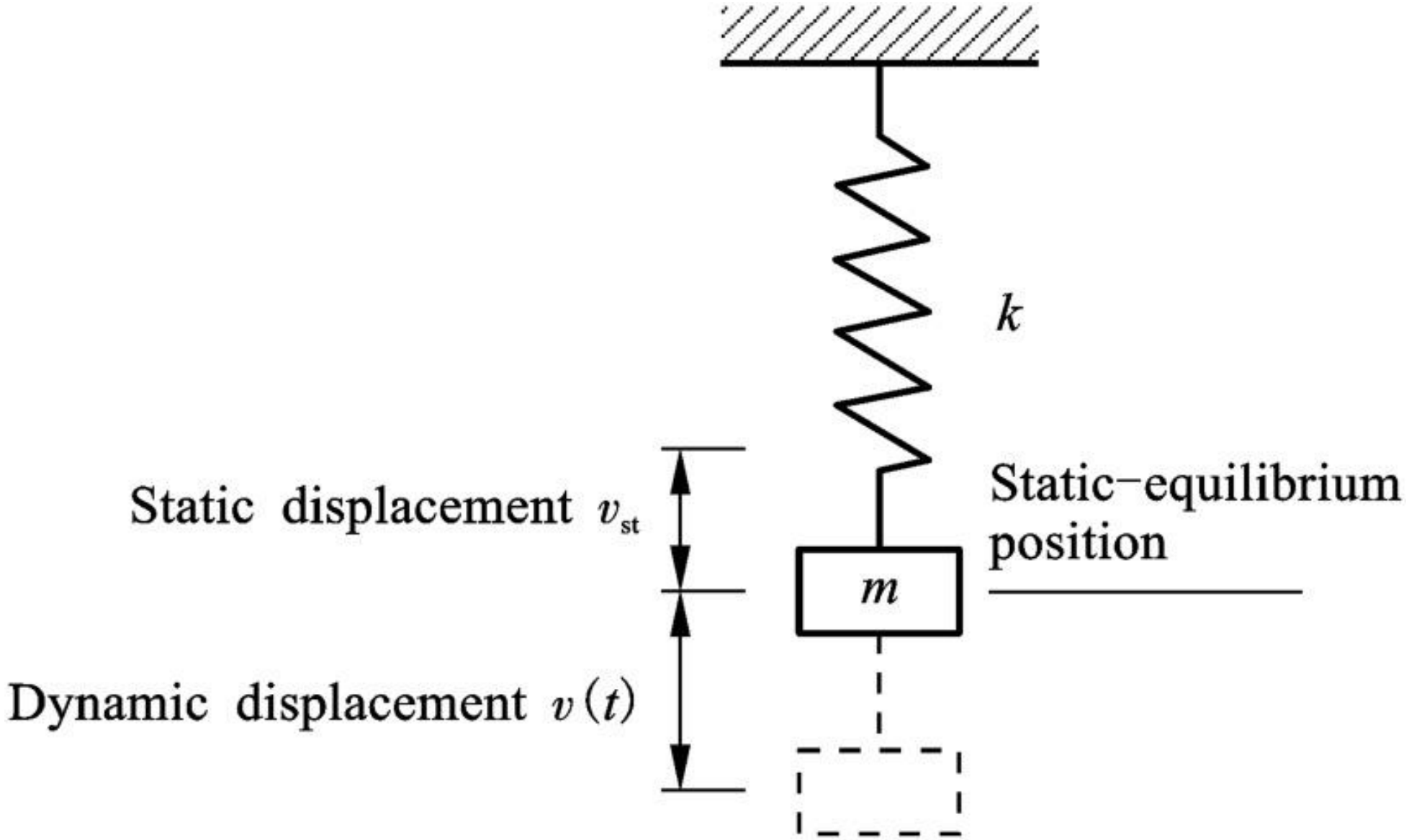
$$x(t) = A\cos(\omega t + \phi)$$

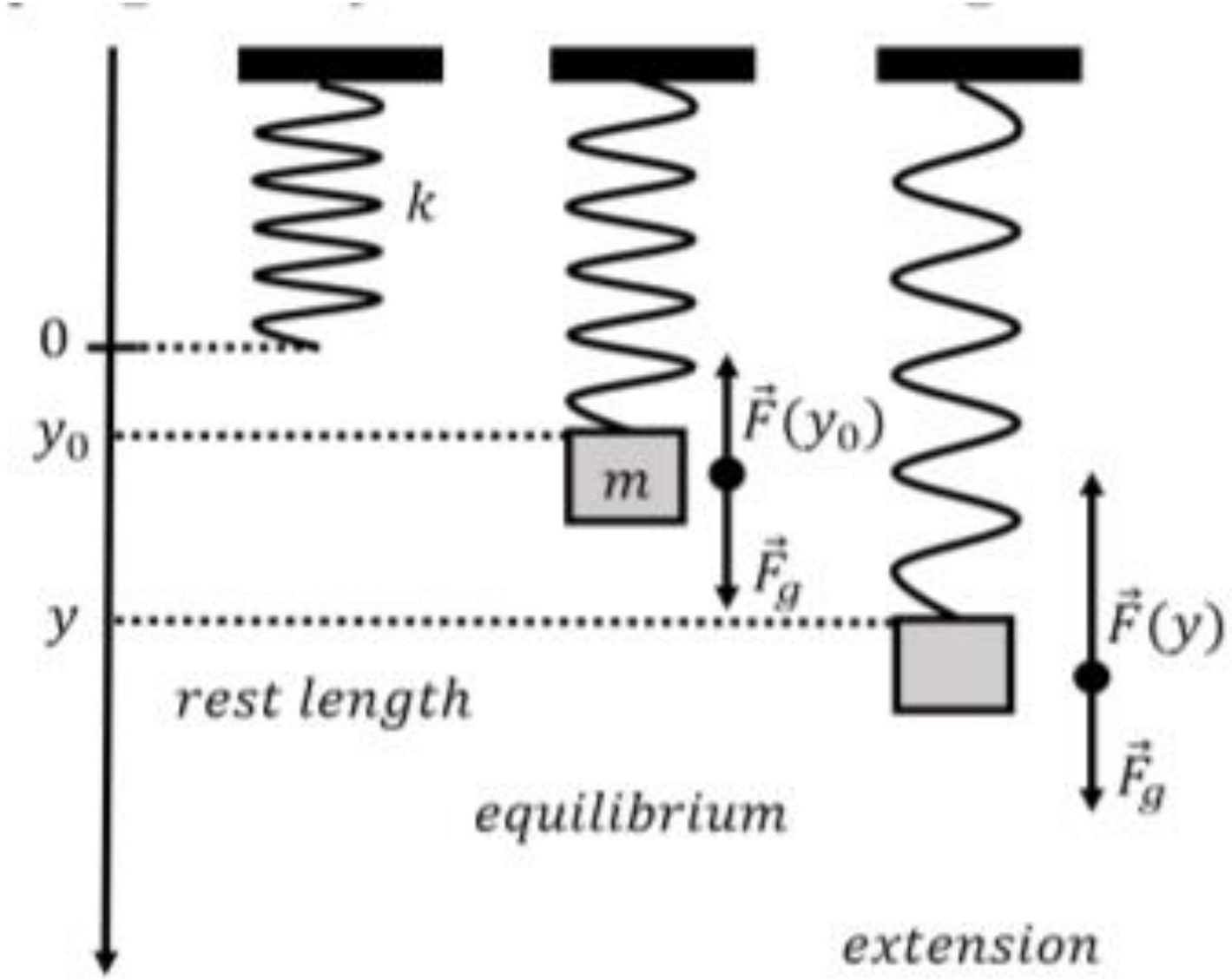
- $A=const$ is the amplitude of the motion
- $\omega=const$ is the angular frequency of the motion

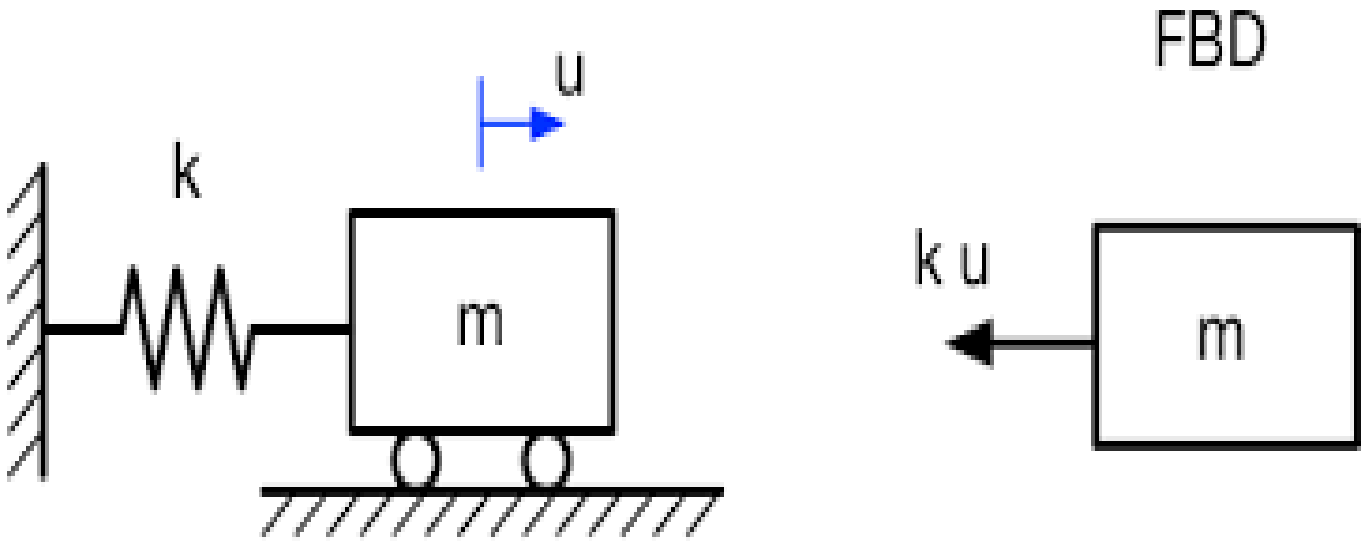
$$\omega = \sqrt{\frac{k}{m}}$$

- $\phi=const$ is the phase constant
- $\omega t+\phi$ is the phase of the motion
- $T=const$ is the period of oscillations:

$$T = \frac{2\pi}{\omega} = 2\pi\sqrt{\frac{m}{k}}$$





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