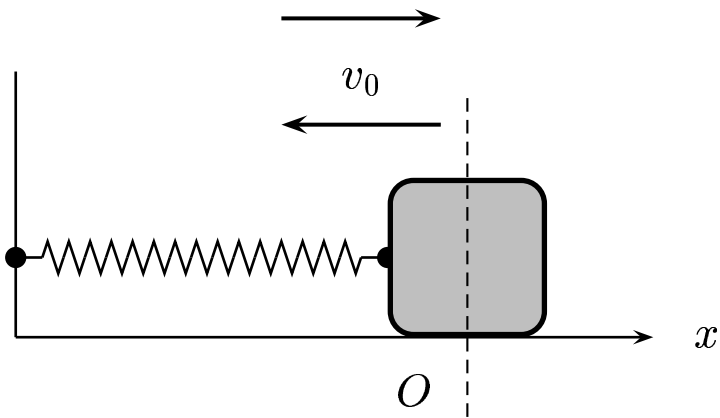


Consider a mass-spring system, where the mass oscillates according to the SHM $x = A \cos(\omega t + \phi)$. At $t = 0$, the mass is at the equilibrium position moving to the left.



Determine the phase angle ϕ .

A) $\phi = 0$.

B) $\phi = \frac{\pi}{2}$.

C) $\phi = \pi$.

D) $\phi = \frac{3\pi}{2}$.

At $t = 0$, from the given, $x = 0 = A \cos \phi$, and $v = -|v_0| = -\omega A \sin \phi$.

Since $\cos \phi = 0$, we have $\phi = \frac{\pi}{2}$ or $\frac{3\pi}{2}$.

From the velocity equation, $|v_0| = \omega A \sin \phi$.

This implies that $\sin \phi$ must be positive.

In other words, $\phi = \frac{\pi}{2}$ is the correct choice.

Answer **B**.

13.02-02 Mass Spring From x_0 v_0 to ϕ and A 2006-9-14