Let $y(t)$ = dist. to right (m) from the equilibrium position at time t (in secs).

Then $my'' + ky = 0.$

$2y'' + 50y = 0$

$y'' + 25y = 0.$

A.E. $r^2 + 25 = 0$

$r^2 = -25, \quad r = \pm 5i.$

The general soln is given by

$y = c_1 \cos 5t + c_2 \sin 5t, \quad c_1, c_2$ constants.

We are given that

$y(0) = -1/4, \quad y'(0) = -1.$

$y(0) = c_1 = -1/4.$

$y' = -5c_1 \sin 5t + 5c_2 \cos 5t.$

$y'(0) = 5c_2 = -1, \quad c_2 = -1/5.$

So

$$y = -\frac{1}{4}\cos 5t - \frac{1}{5}\sin 5t$$

$$= A \sin(5t + \phi)$$

$$= A(\sin 5t \cos\phi + \cos 5t \sin\phi)$$

$A\cos\phi = -1/5$

$A\sin\phi = -1/4$

$$A = \sqrt{\frac{1}{25} + \frac{1}{16}} = \sqrt{\frac{16+25}{25\cdot 16}} = \frac{\sqrt{41}}{20}.$$

$$\tan\phi = \frac{-1/4}{-1/5} = 5/4.$$

ϕ is polar angle of point $(-1/5, -1/4)$ which is in 3rd quadrant.

So

$$\phi = \tan^{-1}(5/4) + \pi \approx 4.04.$$