

PAG. 897 N 44

$$y_1 = a \cos(\omega t + \varphi_0) \quad y_2 = a \cos \omega t$$

$$A = \frac{1}{2} a$$

$$A = 2a \cos \frac{\varphi_0}{2}$$

DIFFERENZA DI FASE =  $\omega t + \varphi_0 - \omega t = \varphi_0$   
(SFASAMENTO)

$$\frac{1}{2} a = 2a \cos \frac{\varphi_0}{2}$$

$$\cos \frac{\varphi_0}{2} = \frac{1}{4} \implies \frac{\varphi_0}{2} = \arccos \frac{1}{4}$$

$$\varphi_0 = 2 \arccos \frac{1}{4} = \boxed{151^\circ}$$

PAG. 837 N 46

$$y_1 = a \cos(10t) \quad y_2 = a \cos\left(10t + \frac{\pi}{3}\right)$$

$$a = 30 \text{ cm} = 0,30 \text{ m}$$

$$y = y_1 + y_2 = (0,52 \text{ m}) \cos\left(10t + \frac{\pi}{6}\right)$$

$$A = 2a \cos \frac{\varphi_0}{2} = 0,60 \text{ m} \cdot \underbrace{\frac{\sqrt{3}}{2}}_{\cos \frac{\pi}{6}} = 0,52 \text{ m}$$

PER CALCOLARE QUANDO  $y=0$

$$\cos \alpha = 0 \quad \alpha = \frac{\pi}{2} + k\pi$$

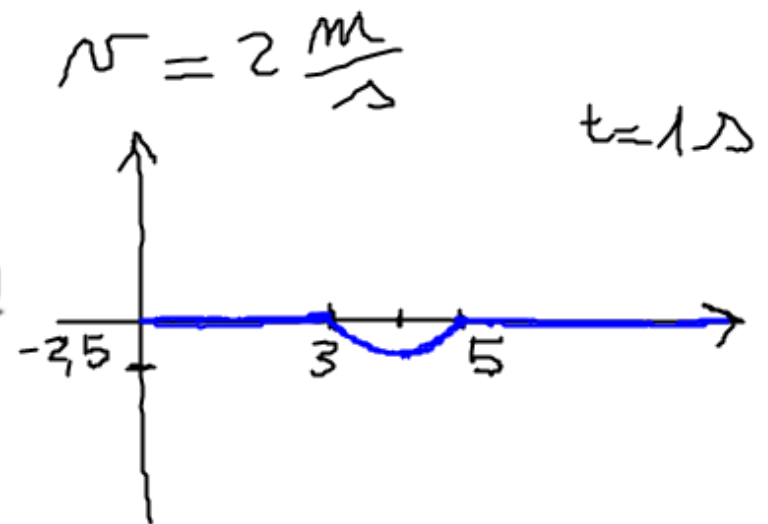
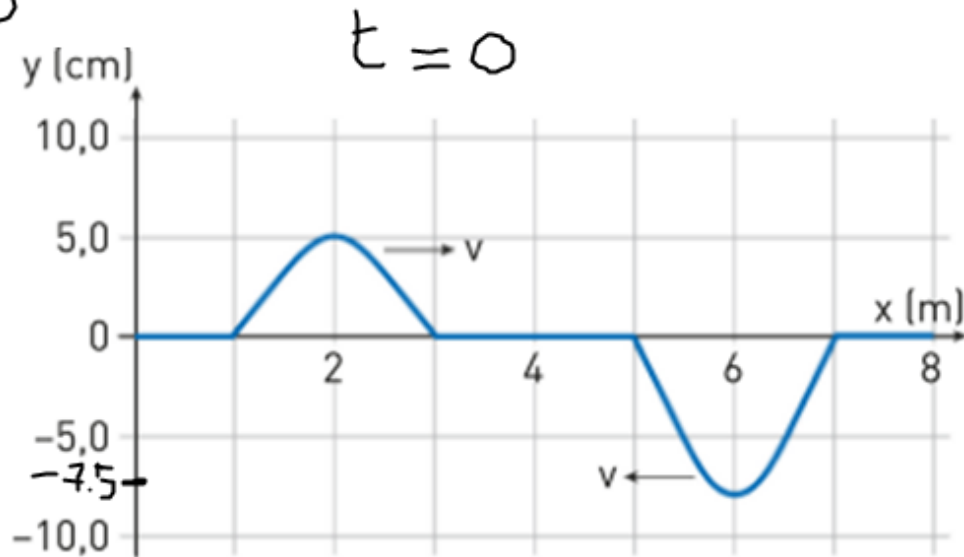
$$\cos\left(10t + \frac{\pi}{6}\right) = 0$$

$$10t + \frac{\pi}{6} = \frac{\pi}{2} + K\pi$$

$$10t = \frac{\pi}{2} - \frac{\pi}{6} + K\pi = \frac{2\pi}{6} + K\pi$$

$$t = \frac{\pi}{30} + K\frac{\pi}{10} \rightarrow$$

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Dopo 2s non interferiscono più

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$$A = 20 \text{ cm} = 0,20 \text{ m}$$

$$a = 13 \text{ cm} = 0,13 \text{ m}$$

$$\varphi_0 = ?$$

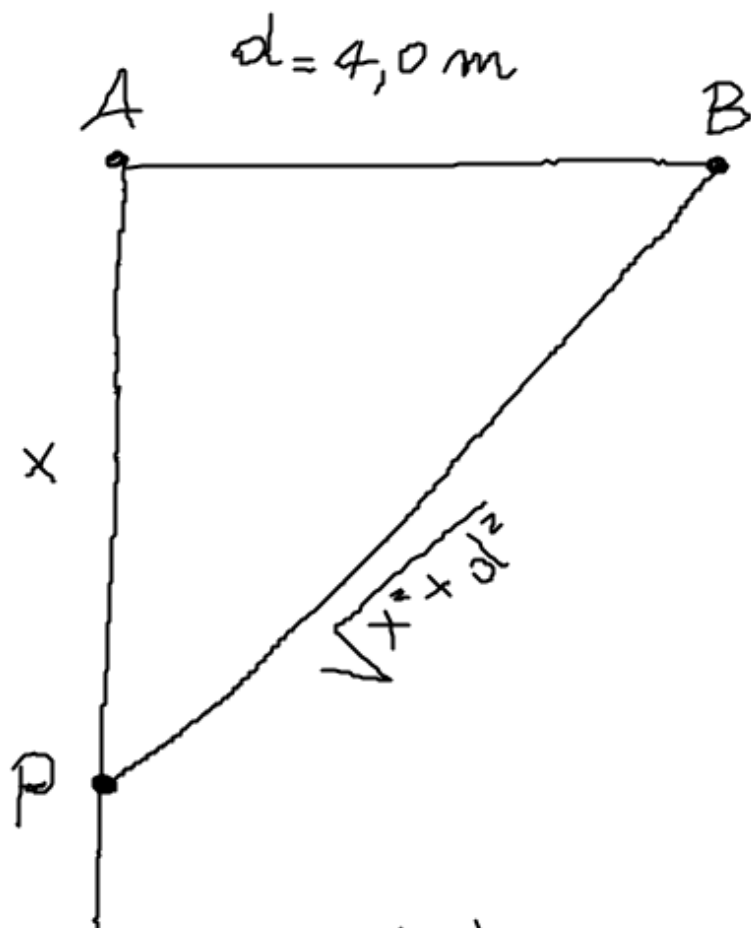
$$A = 2a \cos \frac{\varphi_0}{2}$$

$$0,20 = 0,26 \cdot \cos \frac{\varphi_0}{2}$$

$$\cos \frac{\varphi_0}{2} = \frac{0,20}{0,26}$$

$$\frac{\varphi_0}{2} = \arccos \frac{0,20}{0,26} \Rightarrow \varphi_0 = 2 \cdot \arccos \frac{0,20}{0,26} = 1,4 \text{ rad}$$

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$$\lambda = 1,0 \text{ m}$$

Per avere interferenza distruttiva deve essere

$$\overline{BP} - \overline{AP} = \frac{\lambda}{2} (2k + 1) \quad k = 0, 1, 2, 3, 4, \dots$$

$$\sqrt{x^2 + 16} - x = \frac{1}{2}(2k+1) \quad k=0,1,2,3,\dots$$

$$\sqrt{x^2 + 16} = x + \frac{2k+1}{2}$$

$$\cancel{x^2} + 16 = \cancel{x^2} + \frac{4k^2 + 1 + 4k}{4} + 2kx + x$$

$$64 = (2k+1)^2 + 4x(2k+1)$$

$$4x = \frac{64 - (2k+1)^2}{2k+1} \rightarrow x \geq 0$$

~~se se se se~~

$$64 - (2k+1)^2 \geq 0$$

$$2k+1 \leq 8$$

$$k \leq \frac{7}{2} = 3,5 \Rightarrow \boxed{k=0,1,2,3}$$

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