P. 898 n 49

$y_1 \rightarrow a = 10cm = 0,10\,m$ $\quad y_2 = ?$

$\omega = 10\ rad/s$

$\varphi_1 = 0$

$y_2 \rightarrow a = 0,10\,m$

$y = y_1 + y_2$

$A = \frac{1}{4}\,a$

$y_1 = a \cdot \cos \omega t$

$y_1 = (0,10\,m) \cdot \cos\left(10 \frac{rad}{s} t\right)$

$A = 2a \cos \frac{\varphi_0}{2} \rightarrow y_2$

$\frac{1}{4} a = 2a \cdot \cos \frac{\varphi_0}{2}$

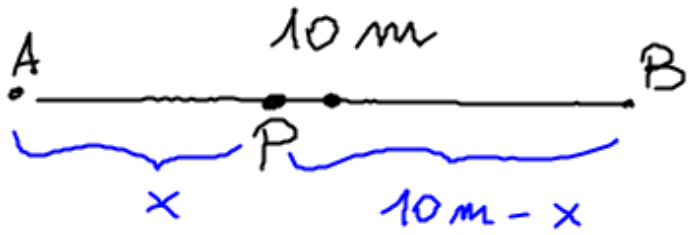
$$\frac{1}{4} = 2 \cdot \cos\frac{\gamma_0}{2}$$

$$\cos\frac{\gamma_0}{2} = \frac{1}{8}$$

$$\frac{\gamma_0}{2} = \arccos\frac{1}{8}$$

$$\gamma_0 = 2\arccos\frac{1}{8} = 2{,}9 \text{ rad}$$

PAG. 898 N 52



$0 \leq x \leq 10\ m$

$f = 170\ Hz$

$v = 340\ \frac{m}{s}$

$\lambda = \frac{v}{f} = \frac{340\ \frac{m}{s}}{170\ Hz} =$

$= 2{,}00\ m$

$\left|\overline{AP} - \overline{BP}\right| = \frac{\lambda}{2}(2k+1) \qquad k = 0, 1, 2, 3, \ldots$

$k = 0$

$\left|x - (10-x)\right| = 1$ ← ricordare che è 1,00

$|x - 10 + x| = 1$

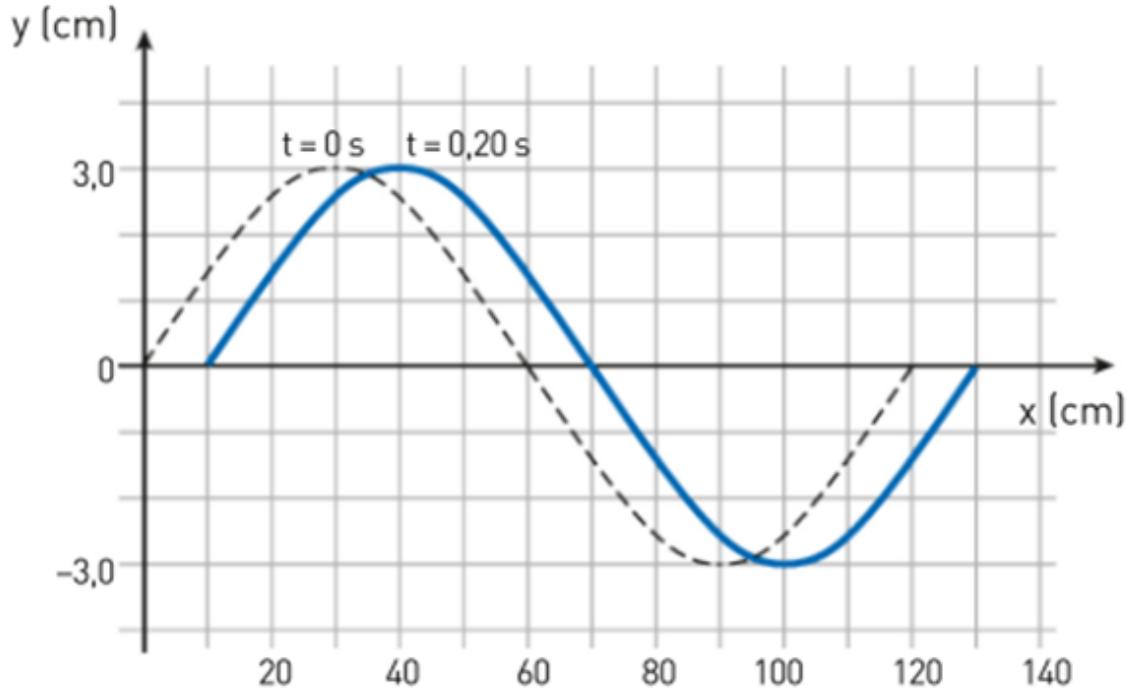
$|2x - 10| = 1$

$2x - 10 = \pm 1$

$2x = 9 \Rightarrow x = 4{,}5\ m$

$2x = 11 \Rightarrow x = 5{,}5\ m$

Pag. 899 N 4



$\lambda = 1{,}20\ m$

$v = \frac{\Delta x}{\Delta t} = \frac{0{,}10\ m}{0{,}20\ s} = 0{,}50\ \frac{m}{s}$

$T = \frac{\lambda}{v} = \frac{1{,}20\ m}{0{,}50\ \frac{m}{s}} = 2{,}4\ s$

$f = \frac{1}{T} = \frac{1}{2{,}4\ s} = 0{,}42\ Hz$

PAG. 300 N 14

$$y = \sqrt{3}\, a \cos\left(\omega t + \frac{\pi}{4}\right)$$

$$y_1 = a\cos(\omega t + \varphi_1) \qquad y_2 = a\cos(\omega t + \varphi_2)$$

$$y_1 + y_2 = y$$

$$a\cos(\omega t+\varphi_1) + a\cos(\omega t+\varphi_2) = a\left[\cos(\omega t+\varphi_1) + \cos(\omega t+\varphi_2)\right] =$$

$$= a \cdot 2 \cos\frac{2\omega t+\varphi_1+\varphi_2}{2} \cos\frac{\varphi_2-\varphi_1}{2} =$$

$$= \underbrace{2a\cos\frac{\varphi_2-\varphi_1}{2}}_{\sqrt{3}\,a} \cos\left(\omega t + \underbrace{\frac{\varphi_1+\varphi_2}{2}}_{\frac{\pi}{4}}\right)$$

$$\begin{cases} 2a\cos\dfrac{\varphi_2-\varphi_1}{2} = a\sqrt{3} \\ \dfrac{\varphi_1+\varphi_2}{2} = \dfrac{\pi}{4} \end{cases} \qquad \begin{cases} \cos\dfrac{\varphi_2-\varphi_1}{2} = \dfrac{\sqrt{3}}{2} \end{cases}$$

$$\frac{\varphi_2-\varphi_1}{2} = \frac{\pi}{6} \Rightarrow \begin{cases} \varphi_2-\varphi_1 = \dfrac{\pi}{3} \\ \varphi_2+\varphi_1 = \dfrac{\pi}{2} \end{cases}$$

SFASAMENTO

$$2\varphi_2 = \frac{5}{6}\pi \Rightarrow \varphi_2 = \frac{5}{12}\pi$$

$$\varphi_1 = \frac{5}{12}\pi - \frac{\pi}{3} = \frac{\pi}{12}$$

$$y_1 = a\cos\left(\omega t + \frac{\pi}{12}\right)$$

$$y_2 = a\cos\left(\omega t + \frac{5}{12}\pi\right) \qquad \Delta\varphi = \frac{\pi}{3}$$