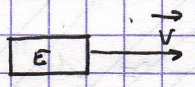
ORMOD - Vélocimètre Doppler → ⚠ non fourni

1. $E_m = Ctc \longrightarrow (M+4m)gh_0 = \frac{1}{2}Mv_0^2 + 4\times\frac{1}{2}J\Omega^2$

$= \frac{1}{2}Mv_0^2 + 2m\cancel{x^2}\frac{v_0^2}{\cancel{x^2}} = \left(\frac{1}{2}M + 2m\right)v_0^2$

$\rightarrow \boxed{v_0 = \frac{(M+4m)gh_0}{\frac{1}{2}M+2m}}$ $\quad v_0 = \left(\frac{0,29\cdot 9,81\cdot 1}{0,140}\right)^{1/2} = \sqrt{2\times 9,81} \rightarrow \underline{v_0 = 4,4\ ms^{-1}}$

2. $f_1 > f_0$



t bip	émis	reçu
	t_0	$t_1 = t_0 + \frac{d}{c}$
	$t_0' = t_0 + T_0$	$t_1' = t_0' + \frac{d - vT_0}{c} = t_0 + T_0 - \frac{vT_0}{c} + \frac{d}{c} = t_1 + T_0\left(1-\frac{v}{c}\right)$

$t_0' - t_0 = T_0$ $\quad \boxed{t_1' - t_1 = T_0\left(1-\frac{v}{c}\right) = T_1} \longrightarrow \boxed{f_1 = f_0\frac{1}{1-\frac{v}{c}}}$

3. E et R sont fixes.

· Oscillogrammes en phase si $d = N\lambda = NcT = \frac{Nc}{f_0} \rightarrow \boxed{c = \frac{f_0 d}{N}}$

hyp: N = 1 ←

$c = \frac{3,2}{N}\times 10^2\ ms^{-1}$

NB: Dans l'air $c \simeq 320\ ms^{-1}$

4. $c \gg v \Rightarrow$ $\quad f_1 \overset{DL}{\simeq} f_0(1+\frac{v}{c})^2 \overset{DL}{\simeq} f_0\left(1+\frac{2v}{c}\right) \rightarrow \boxed{f_1 - f_0 = f_0\frac{2v}{c}}$

$s(t) \propto \cos\left((f_1-f_0)\cdot 2\pi t\right)\cdot\cos\left((f_1+f_0)2\pi t\right)$

$T = \frac{1}{f_1-f_0} = 2\ ms \rightarrow \boxed{v = \frac{f_1-f_0}{f_0}\cdot\frac{c}{2}}$ $\quad v = \frac{500}{4010^3}\times\frac{320}{2}$

$v = \frac{\sqrt{}\times 320}{800} = 2,0\ ms^{-1}$