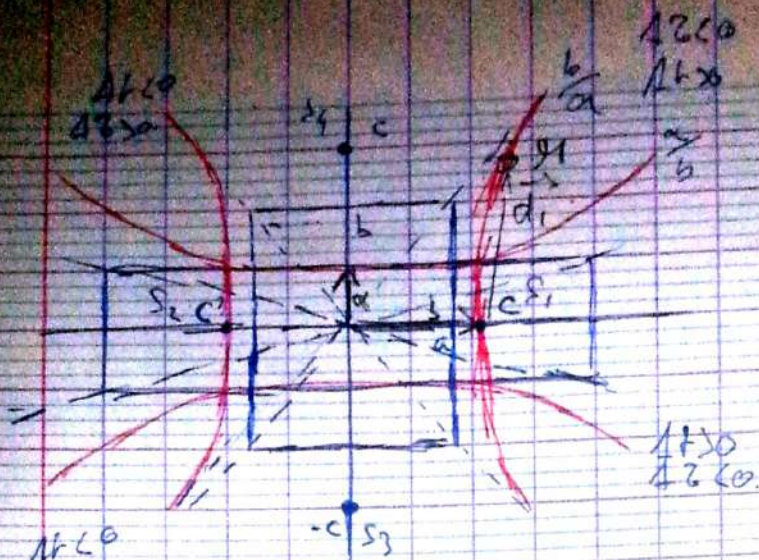




$$\left(\frac{x}{a}\right)^2 - \left(\frac{y}{b}\right)^2 = 1$$

$$a^2 + b^2 = c^2$$

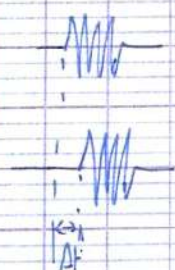
Asym de pente $\frac{b}{a}$

$$b^2 = c^2 - a^2$$

$$a^2 < c^2 \quad a < c$$

Lieu des M / $|\vec{d}_2| - |\vec{d}_1| = 2a = \text{cte}$
 $\vec{d}_1 = \vec{S_1 M}$
 $\vec{d}_2 = \vec{S_2 M}$

TD Geopos



$$t_2 = \frac{d_2}{v}$$

$$t_1 = \frac{d_1}{v}$$

$$\Delta t = \frac{d_2 - d_1}{v} = \frac{2a}{v}$$

$d_2 - d_1 = \text{cte} \rightarrow$ Lieu M

$$M \in \Gamma \quad a = \frac{v \Delta t}{2} \quad C = \frac{S_1 S_2}{2}$$

En permettant α et β : $\left(\frac{y}{\alpha}\right)^2 - \left(\frac{x}{\beta}\right)^2 = 1$

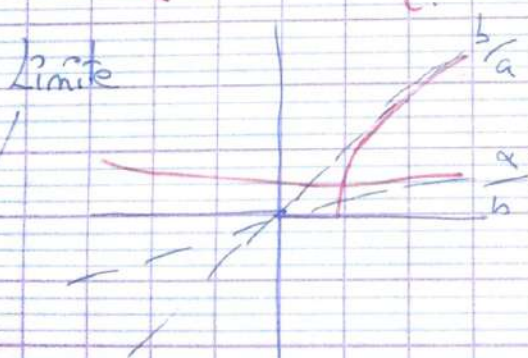
$$\alpha^2 + \beta^2 = c^2$$

$$\alpha = \frac{v \Delta t}{2}$$

$$c = \frac{S_1 S_2}{2}$$

$\Delta t =$ Retard $S_1 S_2$

Limite



$$\alpha a < \beta b$$

$$(\alpha a)^2 < (\beta b)^2 = (c^2 - \alpha^2)(c^2 - \alpha^2)$$

$$\frac{b}{a} > \frac{\alpha}{\beta}$$

$$c^2 + (v \Delta t)^2 = c^2 + (v \Delta t)^2 \Rightarrow c^2 + (v \Delta t)^2 = c^2 + (v \Delta t)^2$$

$$c^2 + (v \Delta t)^2 = c^2 + (v \Delta t)^2 \Rightarrow c^2 + (v \Delta t)^2 = c^2 + (v \Delta t)^2$$

$$\Rightarrow (v \Delta t)^2 + (v \Delta t)^2 = (v \Delta t)^2 + (v \Delta t)^2$$

$$1) \text{ Limite } \frac{v \Delta t}{2} < c \quad \Delta t < \frac{2c}{v} \quad \Delta t < \frac{2c}{v}$$

$$\frac{v \Delta t}{2} = \frac{60}{3 \cdot 10^8} = 0,333 \cdot 10^{-7} = 330 \text{ ps}$$

Pos Bateau : $\Delta t = 200 \text{ ps} \Rightarrow a = \frac{v \Delta t}{2} = 60 \cdot 10^{-6} \times 2 \cdot 10^8 = 2 \cdot 10^4 = 2 \text{ km}$

$$b^2 = c^2 - a^2 = (50)^2 - (20)^2 = (50 - 20)(50 + 20) = 30 \times 70 = 2100$$

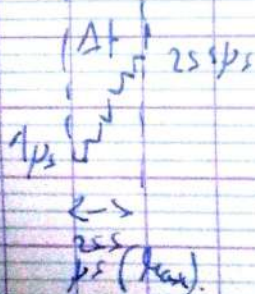
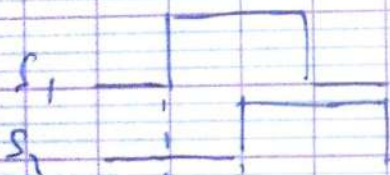
$$\sqrt{b^2} = \sqrt{2100} = 45,8 \text{ km}$$

$$\Delta t = 250 \text{ ps} \Rightarrow d = 125 \cdot 10^{-6} \times 2 \cdot 10^8 = 25 \cdot 10^2 = 2500 \text{ m} = 2,5 \text{ km}$$

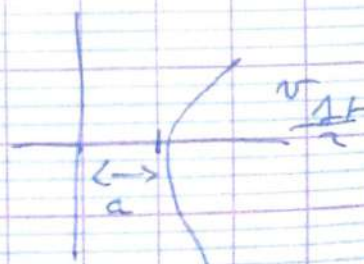
$$b^2 = c^2 - d^2 \Rightarrow \sqrt{b^2} = 33,1 \text{ km}$$

$$x = 78 \text{ km}$$

$$y = 96 \text{ km}$$



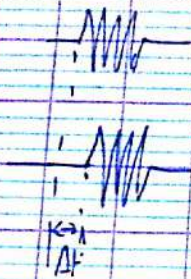
$$\Rightarrow F = 19 \text{ MHz}$$



Error:

$$\frac{10^6 \times 3 \cdot 10^8}{2} = 150 \text{ m}$$

T.D. Geopos



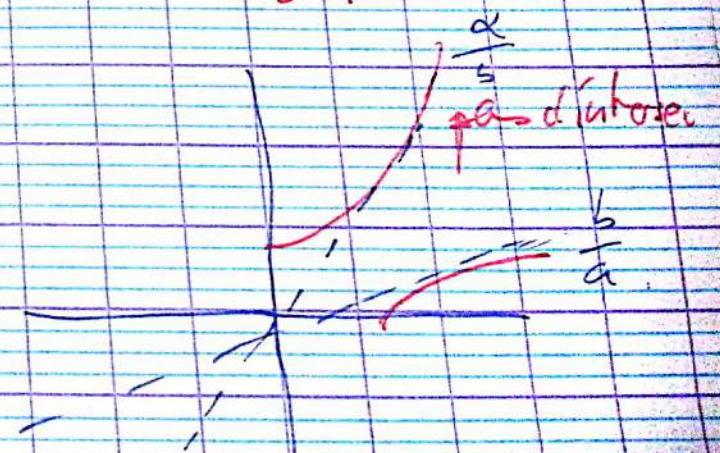
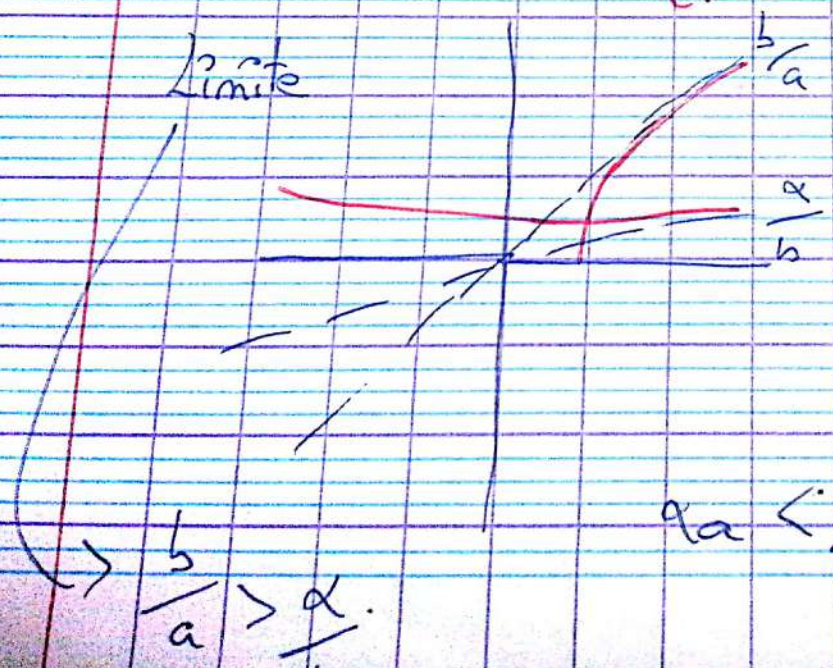
$$t_2 = \frac{d_2}{v} \quad t_1 = \frac{d_1}{v}$$

$$\Delta t = \frac{d_2 - d_1}{v} = \frac{2a}{v} \quad d_2 - d_1 = \text{cte} \rightarrow \text{lien } H.$$

$$\left[\mu \in \mathbb{T} \mid \mu = \frac{v \Delta t}{2} \quad C = \frac{s_1 s_2}{2} \right]$$

En permettant metry. $\left(\frac{y}{x}\right)^2 - \left(\frac{z}{p}\right)^2 = 1$
 $x^2 + p_0^2 = e^2$

$$x = \frac{v \Delta t}{2} \quad c = \frac{s_3 s_4}{2} \quad \Delta t = \text{Retard } s_3 s_4$$



$$\alpha a < \beta b \quad (\alpha a)^2 < (\beta b)^2 = (c^2 - a^2)(c^2 - b^2)$$

$$\cancel{(ca^2)} \quad (c^2 + (va)^2 = c^2(a^2 + v^2)) \Rightarrow c^2 = (ca^2 + (va)^2)$$

$$a^2 + v^2 < c^2 \Rightarrow \left(\frac{v \Delta t}{2} \right)^2 + \left(\frac{v \Delta z}{2} \right)^2 < c^2$$

$$\Rightarrow \left[(\Delta t)^2 + (\Delta z)^2 \right] < \left(\frac{2c}{v} \right)^2$$

1) Limite $\frac{v \Delta t}{2} < c \quad \Delta t < \frac{2c}{v} \quad \Delta z < \frac{2c}{v}$

$$\frac{2c}{v} = \frac{60^5}{3 \cdot 6^8} = \underline{0,333 \cdot 10^{-7}} = 330 \text{ ps.}$$

Pos° Bateau : $\Delta t = 200 \mu s \Rightarrow a = \frac{v \Delta t}{2} = 60 \cdot \frac{6^6 \cdot 2 \cdot 10^5}{2} = 2 \cdot 10^4 = 2 \text{ km}$

$$b^2 = c^2 - a^2 = (50)^2 - (30)^2 = (50 - 30)(50 + 30)$$

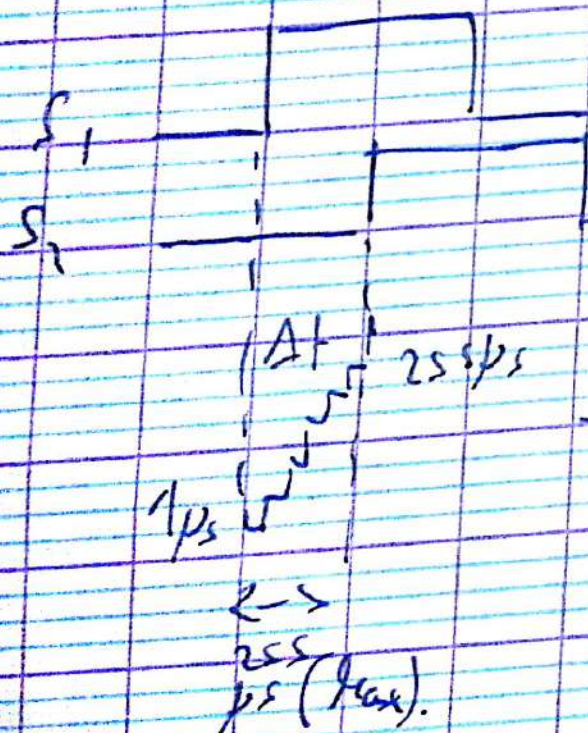
$$= 20 \cdot 80 = 1600$$

$$\boxed{b = 40 \text{ km}}$$

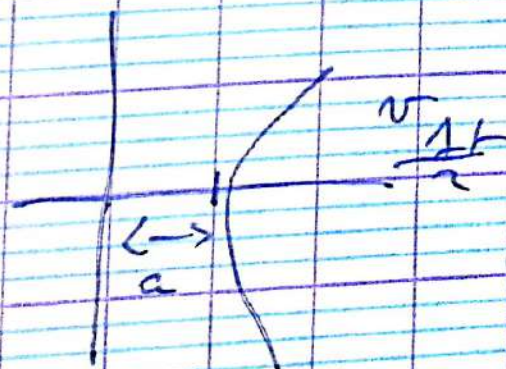
$$\Delta t = 250 \mu s \Rightarrow d = 125 \cdot 10^{-6} \times 3 \cdot 10^8 = 375 \cdot 10^2 = \underline{37,5 \text{ km}}$$

$$\beta^2 = c^2 d^2 \dots \quad \boxed{\beta = 33,1 \text{ km}}$$

$$\begin{cases} x = 78 \text{ km} \\ y = 96 \text{ km} \end{cases}$$



$$\Rightarrow F = 1 \text{ MHz}$$



$$\begin{aligned} \text{Erreur:} \\ \frac{10^{-6} \times 3 \cdot 10^8}{2} \end{aligned}$$

$$= 150 \text{ m}$$