Les Mouvements : suite des applications :

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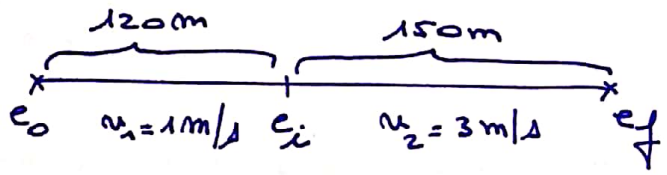

$$t_1 = \frac{120\,m}{1\,m/s} = 120\,s$$

$$t_2 = \frac{150\,m}{3\,m/s} = 50\,s$$

$$v_{moy} = \frac{\Delta e_{tot}}{\Delta t_{tot}} = \frac{120\,m + 150\,m}{120\,s + 50\,s}$$

$$v_{moy} = 1{,}59\ m/s.$$

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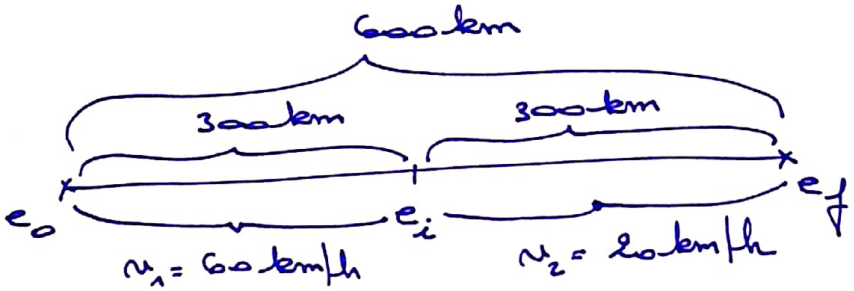


$$v_{moy} = ? = \frac{\Delta e_{tot}}{\Delta t_{tot}} \Rightarrow$$

$$t_1 = ? = \frac{\Delta e_1}{v_1} = \frac{300\,km}{60\,km/h}$$

$$t_2 = ? = \frac{\Delta e_2}{v_2} = \frac{300\,km}{20\,km/h}$$

$$v_{moy} = \frac{600\,km}{\left[\frac{300\,km}{60\,km/h} + \frac{300\,km}{20\,km/h}\right]} = \frac{600\,km}{5\,h + 15\,h}$$

$$v_{moy} = 30\,km/h.$$

LE MOUVEMENT RECTILIGNE UNIFORME

MRU

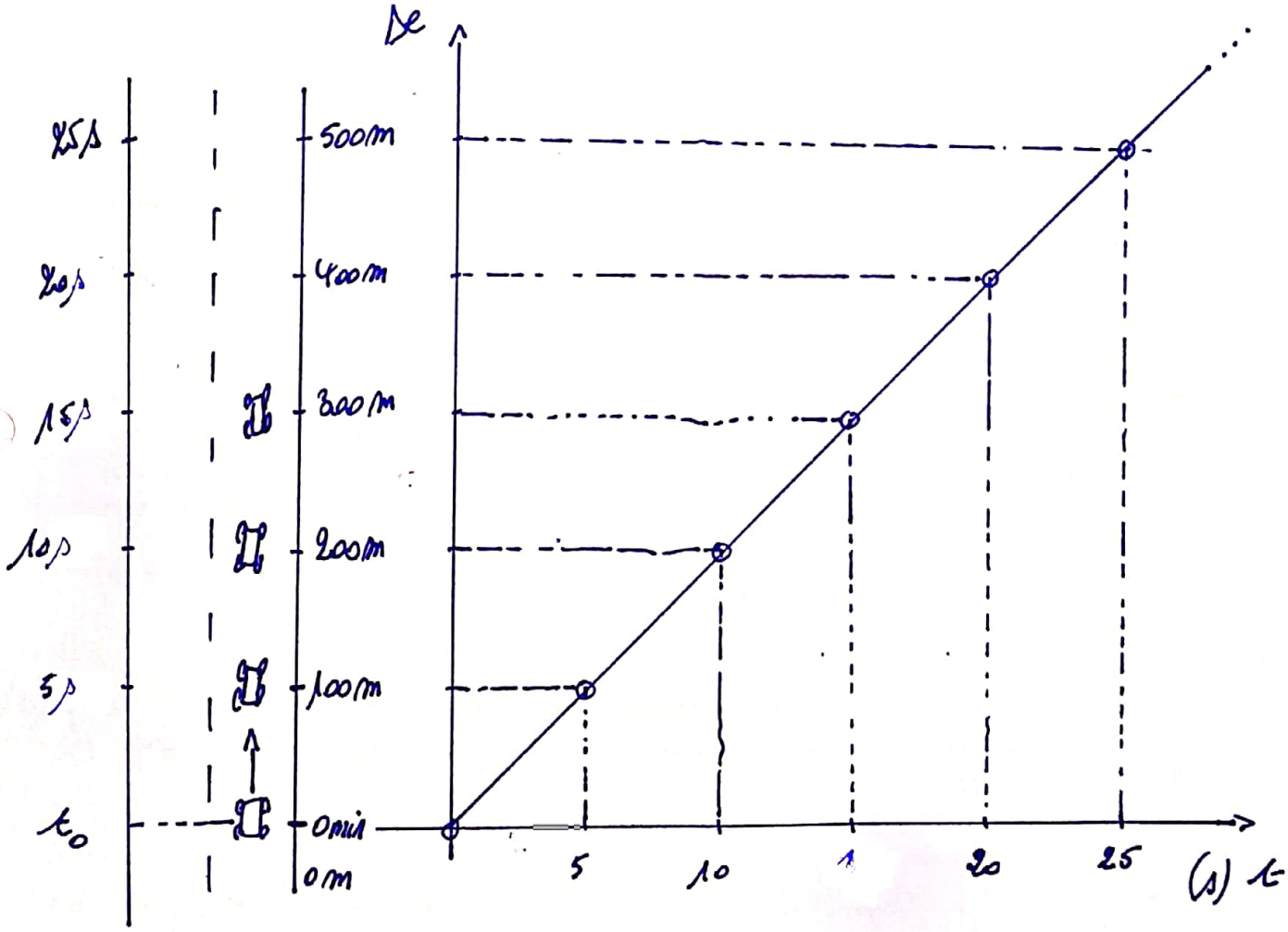
Conditions d'un MRU ?

→ Trajectoire RECTILIGNE

→ VITESSE UNIFORME (CONSTANTE)

→ ACCELERATION NULLE

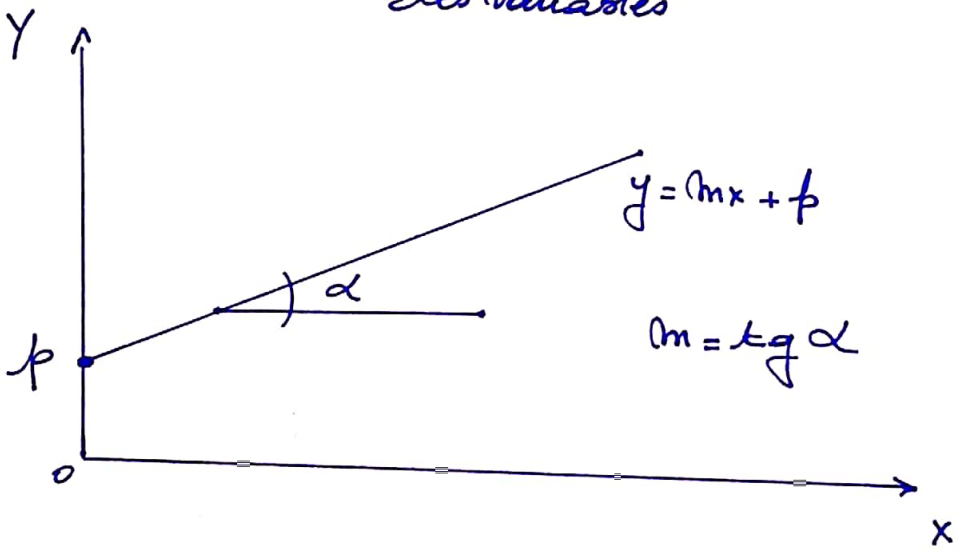
Situation d'un MRU :

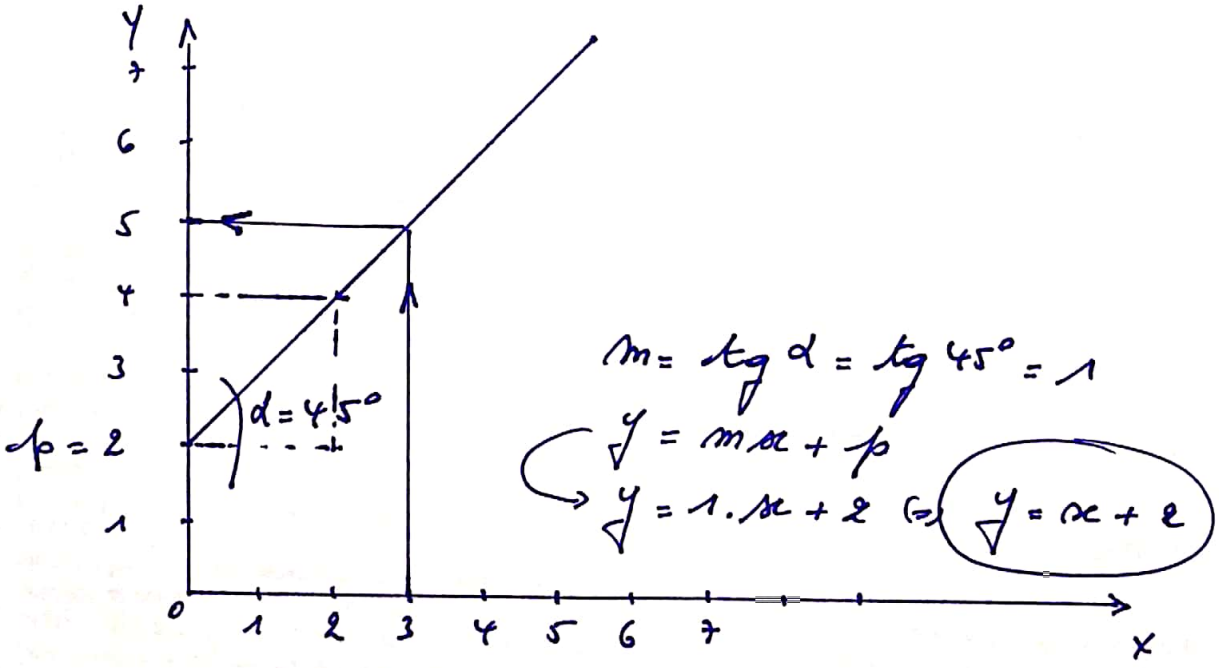


Equation d'une droite

$y = mx + p$

- m : coefficient de direction
- p : ordonnée à l'origine
- x et y : les variables



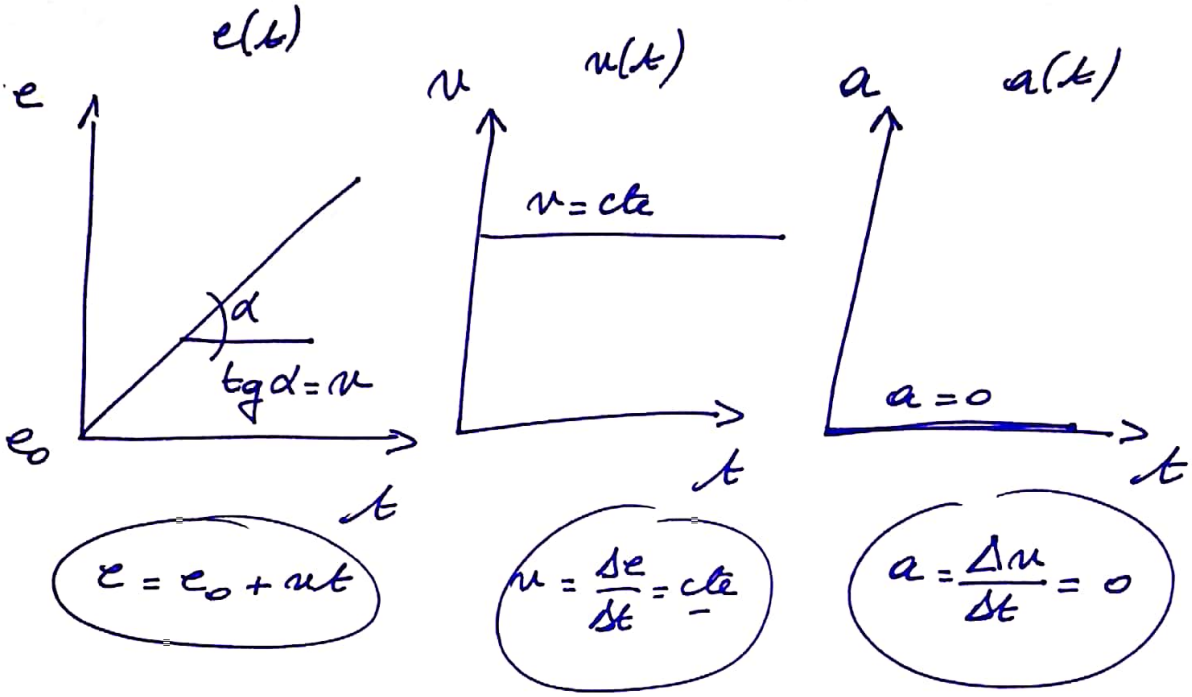


$m = tg\,\alpha = tg\,45° = 1$

$y = mx + p$

$y = 1.x + 2 \Rightarrow y = x + 2$

Allure des graphiques du MRU :



accélération : définition

$$a = \frac{\text{variation de la vitesse}}{\text{temps de la variation}} = \frac{\Delta v}{\Delta t}$$

Application n°2 (p13)

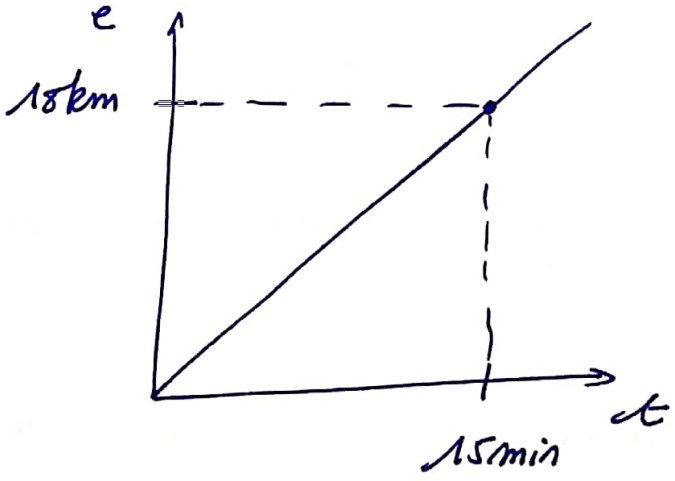
$v = 20 m/s$

$t = 15 min = 900 s$

$\Delta e = v . \Delta t = ?$

$\Delta e = 20 m/s . 900 s$

$\Delta e = 18000 m = 18 km$



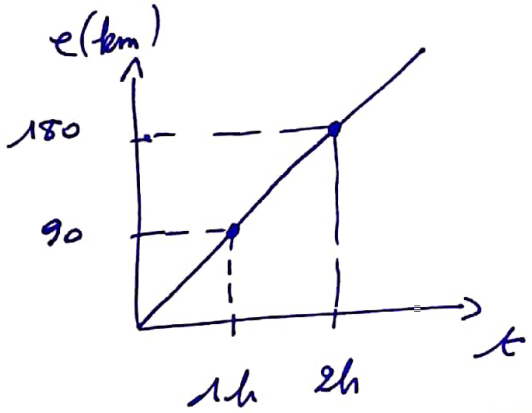
App n°3 (p13)

$v = cte$ (MRU)
$\Delta e = 450\ km$
$t = 5\ h$

$v = \frac{450\ km}{5\ h} = 90\ km/h \xrightarrow{:3,6} = 25\ m/s.$

Après 2h, elle aura parcouru :

$\Delta e = v . \Delta t = 90\ \frac{km}{h} . 2\ h = 180\ km.$



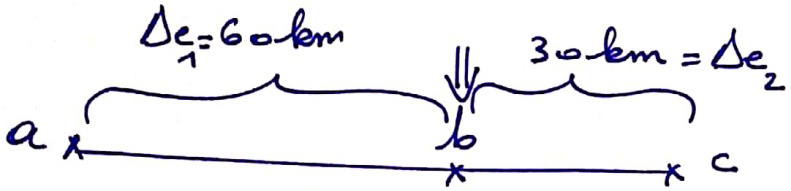
App n°4 (p13)

Voir feuille suivante ...

Appl n°4

ARRET
16min 40s

$v = \frac{\Delta e}{\Delta t}$

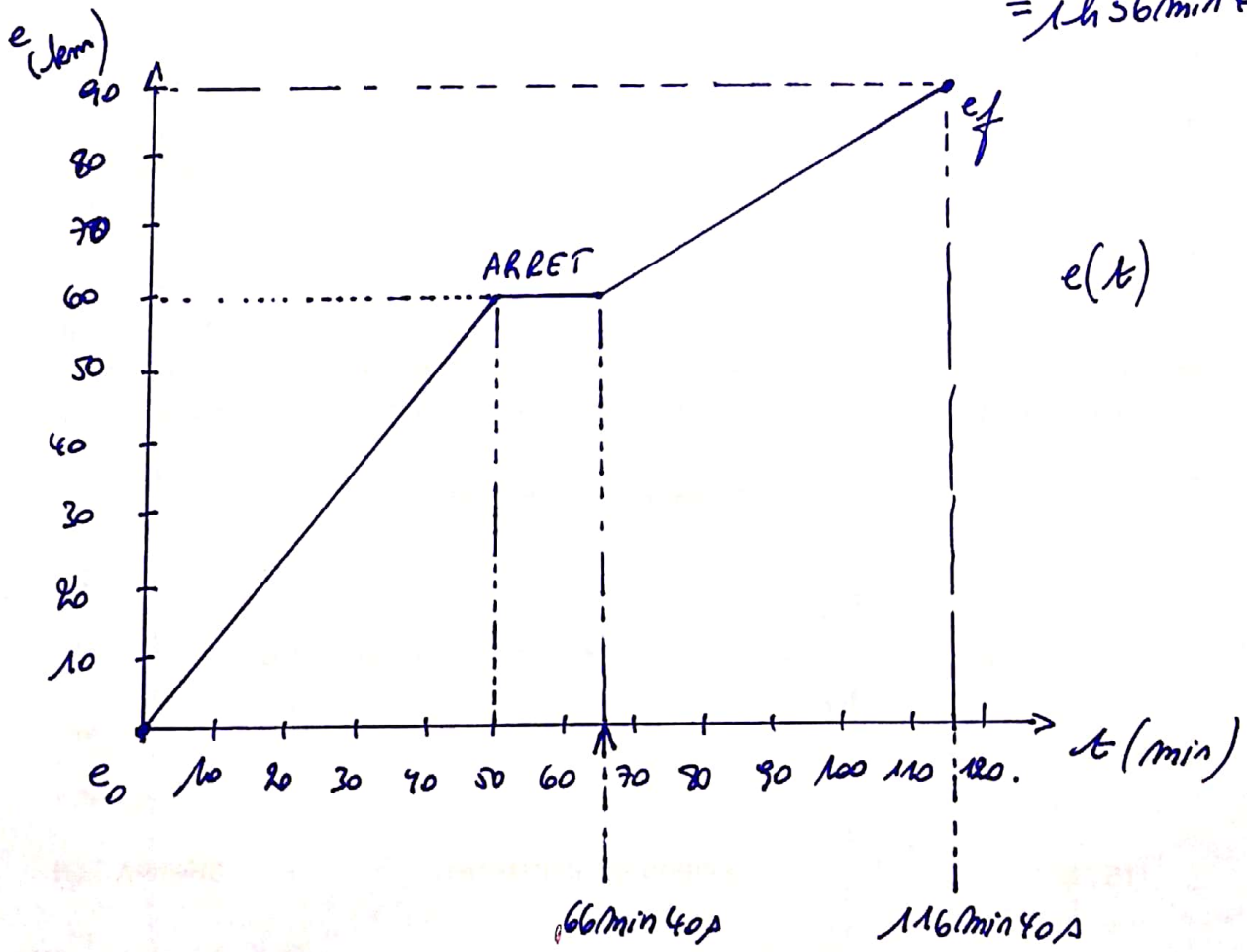


$v_1 = 72\,km/h$ | $v_2 = 36\,km/h$

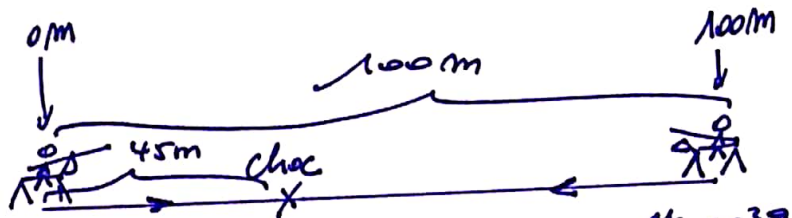
$\Delta t_1 = \frac{\Delta e_1}{v_1} = \frac{60\,km}{72\,km/h}$ | $\Delta t_2 = \frac{\Delta e_2}{v_2} = \frac{30\,km}{36\,km/h}$

$\Delta t_1 = 0{,}833\,h = 50\,min$ (×60) | $\Delta t_2 = 0{,}833\,h = 50\,min.$

$\Delta t_{tot} = 50\,min + 50\,min + 16\,min\ 40\,s = 116\,min\ 40\,s$
$= 1\,h\ 56\,min\ 40\,s.$



1



$v_{lent} = 32,4 \text{ km/h} = 9 \text{ m/s}$

$v_{rapide} = -39,6 \text{ km/h} = 11 \text{ m/s}$

Au moment de l'impact : $e_{lent} = e_{rapide}$

donc $e_{lent} = e_{rapide}$

$\Leftrightarrow e_{0\,lent} + v_{lent} \cdot t = e_{0\,rapide} + v_{rapide} \cdot t$

$\Leftrightarrow 0m + 9m/s \cdot t = 100m \ominus 11m/s \cdot t$

$\Leftrightarrow 9t = 100 - 11t$

$\Leftrightarrow 9t + 11t = 100 \Leftrightarrow 20t = 100 \Leftrightarrow t = \frac{100}{20} = 5s$

L'impact aura lieu après 5s !

Lieu de l'impact : $e = e_0 + v_{lent} \cdot t = 0 + 9m/s \cdot 5s = 45m$

A 45m des plus lent !