cin-tp3.3. MRUA - rail à air - Graphique $t \mapsto v$.

Des mesures se trouvent dans le code *Octave* suivant:

```
clf
clear
#
t=[3.82,3.86,3.86;3.56,3.54,3.67;3.37,3.39,3.39;3.09,3.1,3.06;2.84,2.92,2.82;2.81,2.82,2.75];
v=[46.2,46,46.2;43.6,42.7,43.4;40.4,40.6,40.4;37.5,37.5,37.5;34.2,34.2,34.2;33.8,33.6,33.6];
L=[103,93,83,73,63,61]-14.5;
#
M=212.4;
m=2.8;
#
hold("on")
for n=1:6
 tmin=min(t(n,:));
 tmax=max(t(n,:));
 vmin=min(v(n,:));
 vmax=max(v(n,:));
 plot([tmin,tmax,tmax,tmin,tmin],[vmin,vmin,vmax,vmax,vmin],"r")
 axis([0 4,0,50])
 xlabel("t [s]")
 ylabel("v [cm/s]")
 grid("on")
endfor
npmax=3;
p=(max(v(npmax,:))/min(t(npmax,:)))
ath=m*981/(M+m)
plot([0,4],[0,p*4],"b")
hold("off")
print gr_t_>v.png
#
q=input("Suite ?");
#
clf
hold("on")
dl=0.2;
for n=1:6
 dmin=L(n)-dl;
 dmax=L(n)+dl;
 v2min=min(v(n,:))^2;
 v2max=max(v(n,:))^2;
 plot([dmin,dmax,dmax,dmin,dmin],[v2min,v2min,v2max,v2max,v2min],"r")
 axis([0 105,0,2500])
 xlabel("d [cm]")
 ylabel("v^2 [cm^2/s^2]")
 grid("on")
endfor
npmax=3;
p=max(v(npmax,:))^2/(L(npmax)-dl);
ame=p/2
plot([0,105],[0,p*105],"b")
hold("off")
print gr_d_>v^2.png
#
q=input("Suite ?");
#
clf
hold("on")
dl=0.2;
for n=1:6
```

```
59    dmin=L(n)-dl;
60    dmax=L(n)+dl;
61    t2min=min(t(n,:))^2;
62    t2max=max(t(n,:))^2;
63    plot([t2min,t2max,t2max,t2min,t2min],[dmin,dmin,dmax,dmax,dmin],"r")
64    axis([0  16,0,105])
65    xlabel("t^2  [s^2]")
66    ylabel("d  [cm]")
67    grid("on")
68  endfor
69  npmax=3;
70  p=(L(npmax)+dl)/(min(t(npmax,:))^2);
71  ame=2*p
72  plot([0,16],[0,p*16],"b")
73  hold("off")
74  print  gr_t^2_>d.png
```

Son exécution donne le graphique de la figure 1. On trouve

$$a_{th} \approx 12.8 \text{ [cm/s}^2\text{]}$$

et

$$a_m \approx 12.0 \text{ [cm/s}^2\text{]}$$

Ainsi

$$a_m \in a_{th} \pm 6.5 \text{ \%}$$

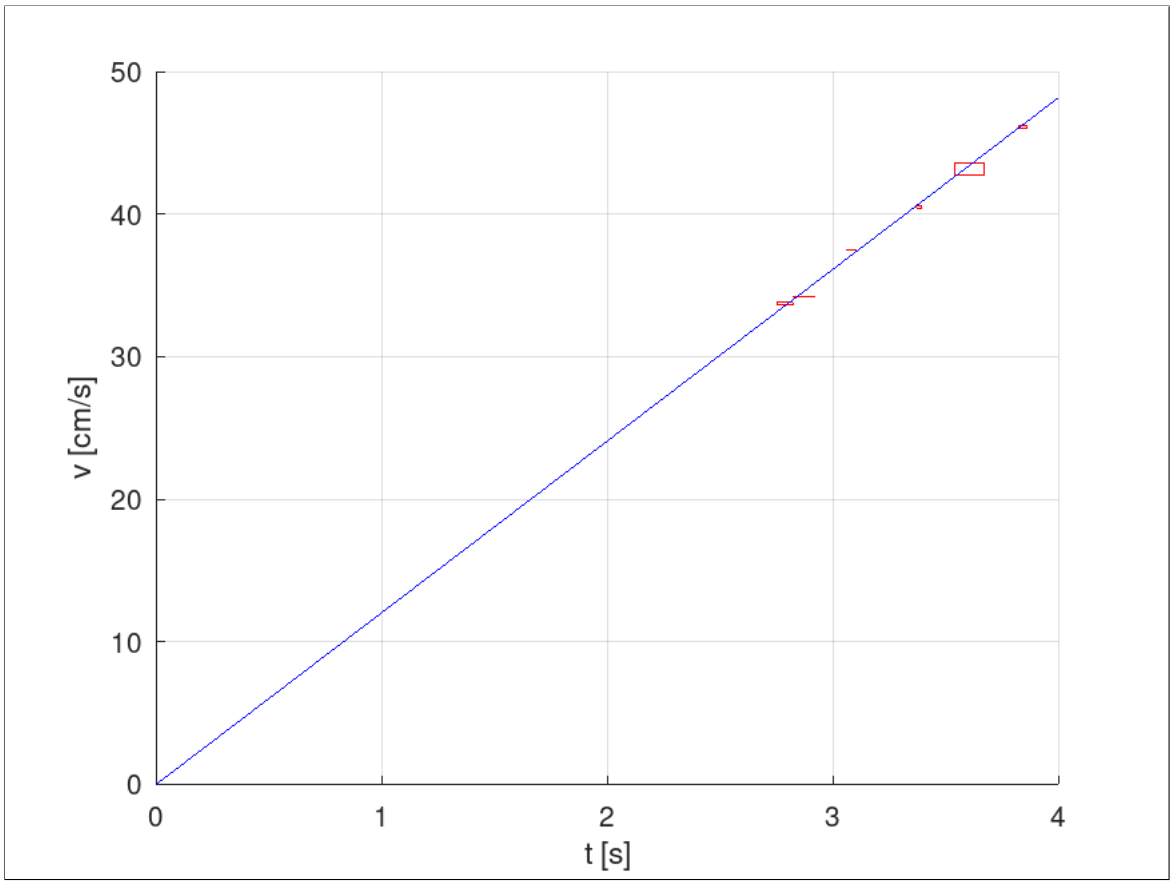

FIGURE 1. Exercice cin-tp3.3

cin-tp3.4. MRUA - rail à air - Graphique $d \mapsto v^2$.
L'exécution du coide *Octave* donne le graphique de la figure 2. On trouve

$$a_{th} \approx 12.8 \text{ [cm/s}^2\text{]}$$

et

$$a_m \approx 12.1 \text{ [cm/s}^2\text{]}$$

Ainsi

$$a_m \in a_{th} \pm 5.5 \text{ \%}$$

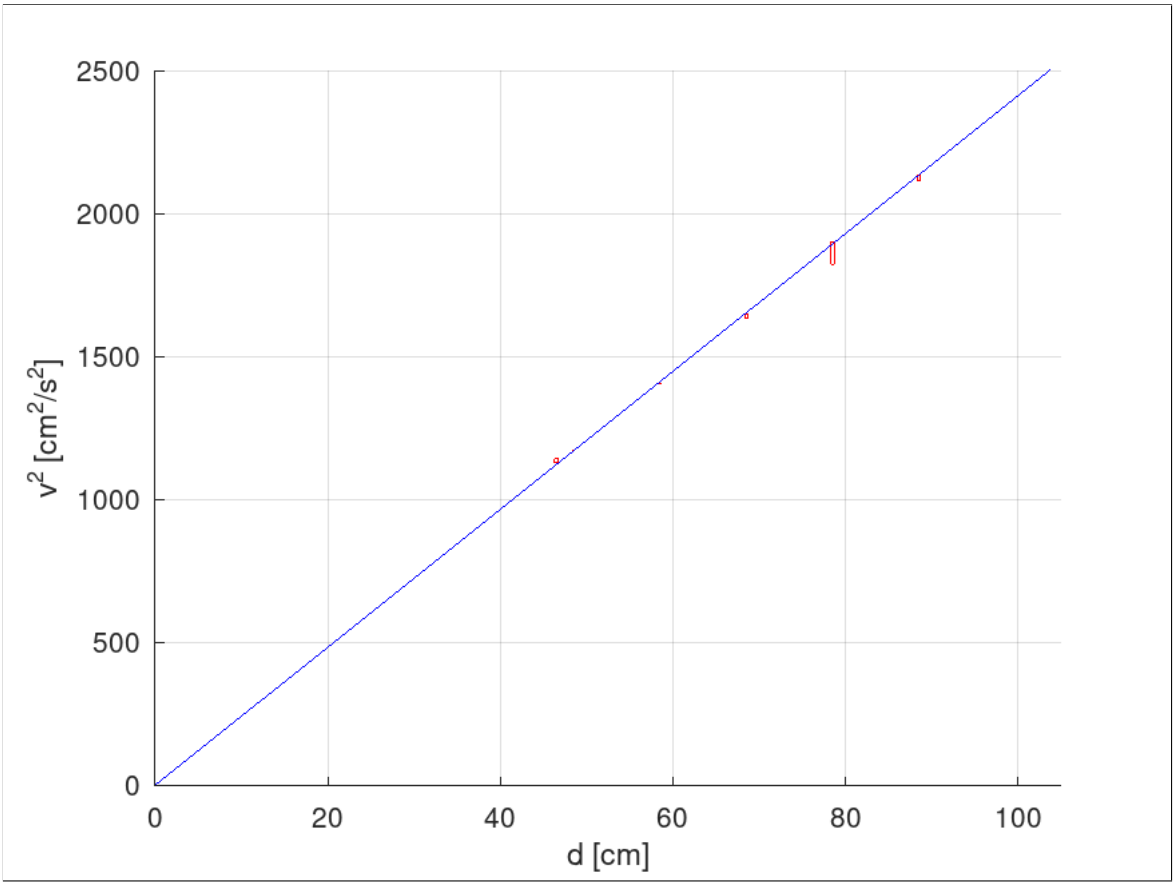

FIGURE 2. Exercice cin-tp3.4

cin-tp3.5. MRUA - rail à air - Graphique $t^2 \mapsto d$.
L'exécution du coide *Octave* donne le graphique de la figure 3. On trouve

$$a_{th} \approx 12.8 \text{ [cm/s}^2\text{]}$$

et

$$a_m \approx 12.1 \text{ [cm/s}^2\text{]}$$

Ainsi

$$a_m \in a_{th} \pm 5.5\ \%$$

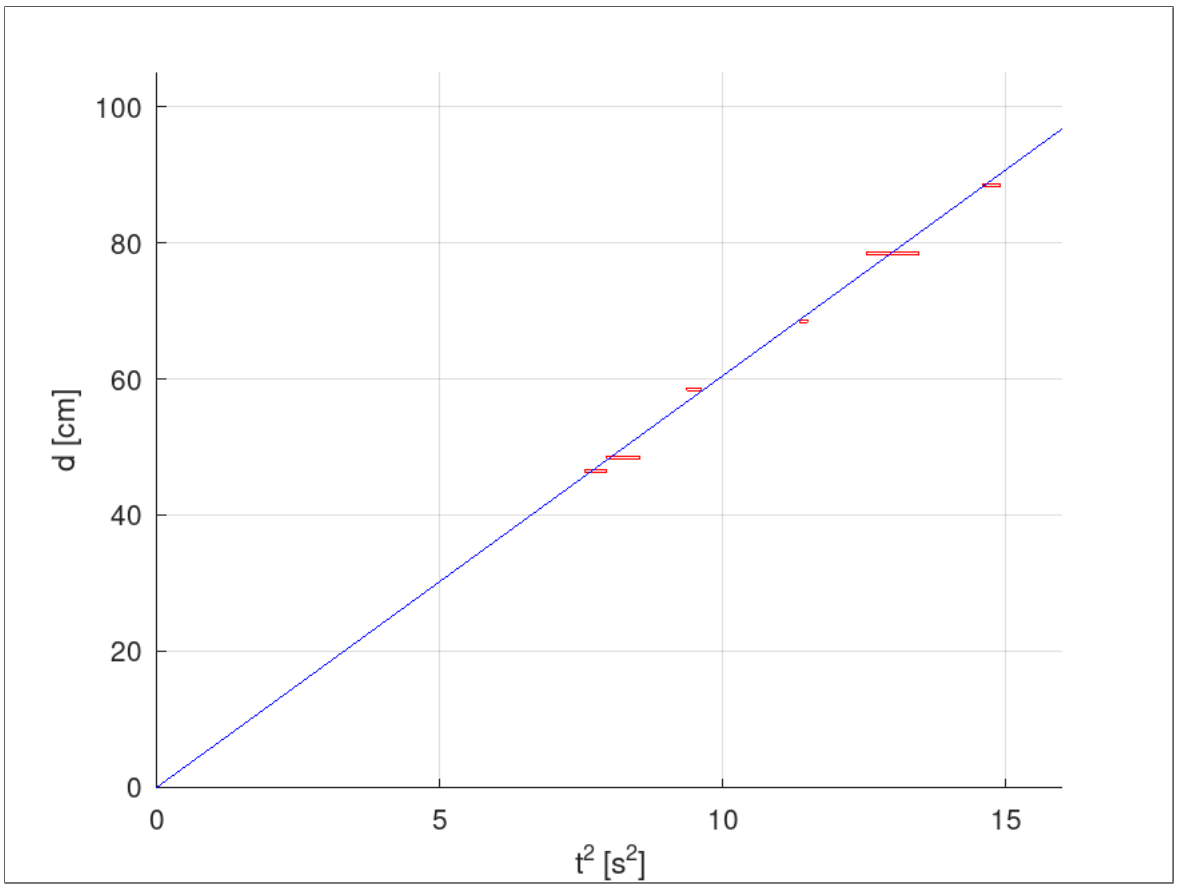

FIGURE 3. Exercice cin-tp3.5