Horaires

$$\vec{r} = \vec{A}t^3 + \vec{B}t \text{ avec } \vec{A} = \begin{pmatrix} 0.1\,\text{m/s}^3 \\ 0 \end{pmatrix} \text{ et } \vec{B} = \begin{pmatrix} -0.4\,\text{m/s} \\ 0.8\,\text{m/s} \end{pmatrix}$$

$$\vec{v} = 3\vec{A}t^2 + \vec{B}$$

$$\vec{a} = 6\vec{A}t$$

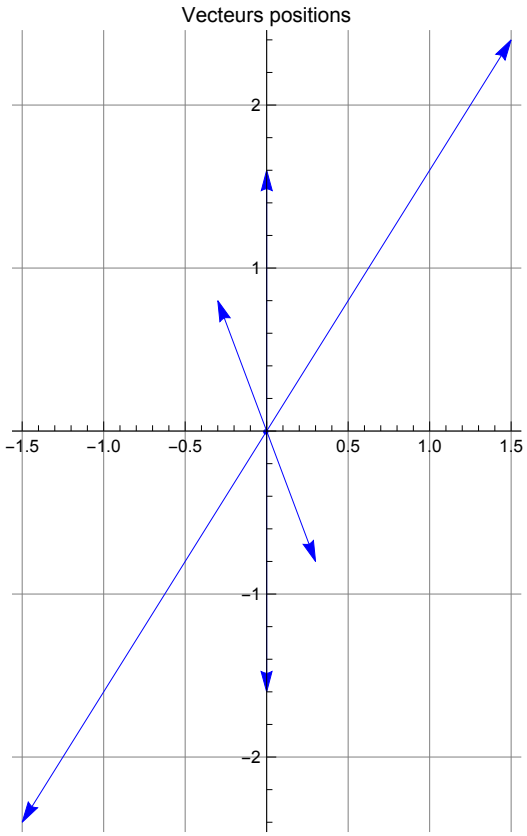
Calcul des composantes

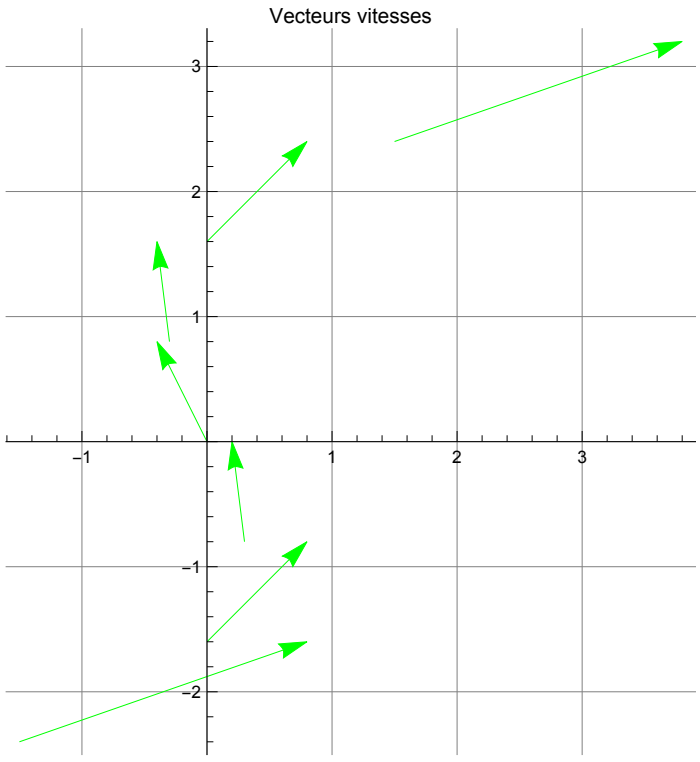
```
A = {0.1, 0};
B = {-0.4, 0.8};
r[t_] := A * t^3 + B * t
t_initial = -3;
t_final = 3;
Δt = 1;
r_xy = Table[r[t], {t, t_initial, t_final, Δt}];
(* composantes du vecteur position *)
v_xy = Table[r'[t], {t, t_initial, t_final, Δt}]; (* composantes du vecteur vitesse *)
a_xy = Table[r''[t], {t, t_initial, t_final, Δt}];
(* composantes du vecteur acc *)
TableForm[Transpose[{{Range[t_initial, t_final, Δt]}, {r_xy}, {v_xy}, {a_xy}}],
 TableHeadings → {None, {"t", "r_xy", "v_xy", "a_xy"}}]
```

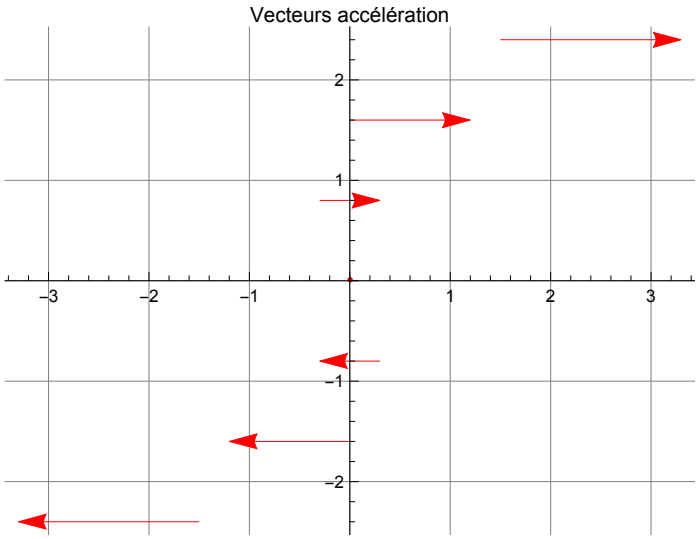
t	r_{xy}		v_{xy}		a_{xy}	
-3	-1.5	-2.4	2.3	0.8	-1.8	0
-2	0.	-1.6	0.8	0.8	-1.2	0
-1	0.3	-0.8	-0.1	0.8	-0.6	0
0	0.	0.	-0.4	0.8	0.	0
1	-0.3	0.8	-0.1	0.8	0.6	0
2	0.	1.6	0.8	0.8	1.2	0
3	1.5	2.4	2.3	0.8	1.8	0

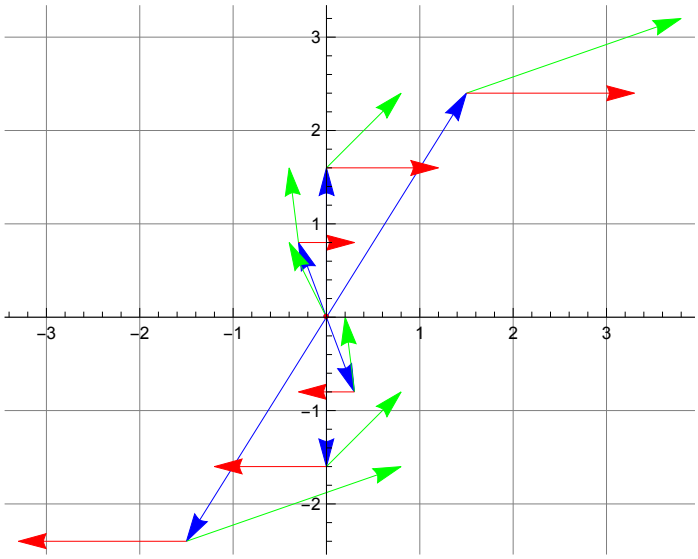
Dessin des vecteurs

```
Transpose[Join[{Table[{0, 0}, {(t_final - t_initial + Δt) / Δt}]}, {r_xy}]];
Map[Arrow, %, 1];
pos = Graphics[{Hue[2 / 3], %}, AspectRatio → Automatic, Axes → True,
   PlotRange → All, GridLines → Automatic, PlotLabel → "Vecteurs positions"]
Transpose[Join[{r_xy, r_xy + v_xy}]];
Map[Arrow, %, 1];
vit = Graphics[{Hue[1 / 3], %}, AspectRatio → Automatic, Axes → True,
   PlotRange → All, GridLines → Automatic, PlotLabel → "Vecteurs vitesses"]
Transpose[Join[{r_xy, r_xy + a_xy}]];
Map[Arrow, %, 1];
acc = Graphics[{Hue[1], %}, AspectRatio → Automatic, Axes → True,
   PlotRange → All, GridLines → Automatic, PlotLabel → "Vecteurs accélération"]
Show[pos, vit, acc, PlotLabel → ""]
```


Vecteurs positions
2
1
−1
−2
−1.5
−1.0
−0.5
0.5
1.0
1.5


Vecteurs vitesses
3
2
1
−1
−2
−1
1
2
3


Vecteurs accélération
2
1
−3
−2
−1
1
2
3
−1
−2


3
2
1
−3
−2
−1
1
2
3
−1
−2