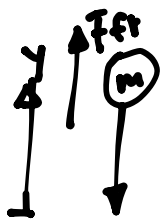


$$m\frac{dv}{dt} = -my - \mu v$$

$$t=0 \quad v(0)=0$$

$$\frac{dv}{dt} = f(v,t) = -g - \frac{\mu}{m} v$$

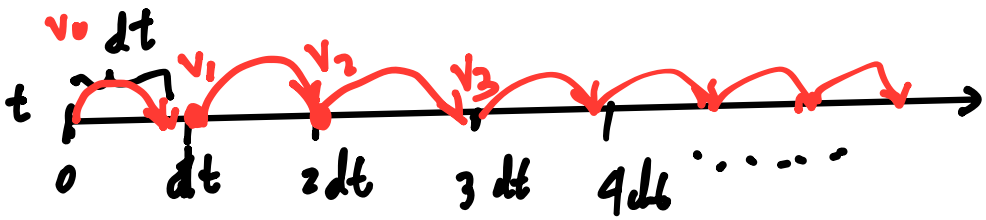
Euler: $\dfrac{v(t+dt)-v(t)}{\Delta t} = f(v(t),t)$

$v_i = v(t)$

$v_{i+1} = v(t+\Delta t)$

$$\frac{v_{i+1}-v_i}{\Delta t} = f(v_i, t_i)$$

$$v_{i+1} = v_i + \Delta t\, f(v_i, t_i) \qquad i = 0,1,2,\ldots,nt$$



2 columns

t	V
0	$V_0=0$
dt	V(dt)
2dt	V(2dt)
⋮	

nt

$V = -97.9897$ (10 pts pour)

$V = -97.9218$ (20 pts)

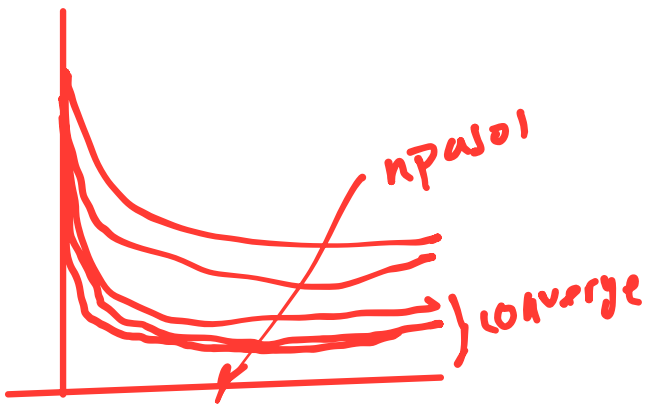
$= -97.85$ (40 pour)

-97.80 (80 pour)

-97.78 (160)

-97.77 (320)

-97.76 (640)



$$\frac{dv}{dt} = -g - \frac{\mu}{m}v$$

$$\int \frac{dv}{g + \frac{\mu}{m}v} = \int -dt$$

$$\frac{m}{\mu}\ln\left(g + \frac{\mu}{m}v\right) = -t + C$$

$$\ln\left(g + \frac{\mu}{m}v\right) = -\frac{\mu}{m}t + \underbrace{\frac{\mu}{m}C}_{C^*}$$

$$g + \frac{\mu}{m} v = e^{-\frac{\mu}{m}t + C^*}$$

$$g + \frac{\mu}{m} v = C\, e^{-\frac{\mu}{m}t}$$

$$\frac{\mu}{m} v = C e^{-\frac{\mu}{m}t} - g$$

$$V = \frac{m}{\mu} C e^{-\frac{\mu}{m}t} - g\frac{m}{\mu}$$

$$V = C e^{-\frac{\mu}{m}t} - \frac{gm}{\mu}$$

$t = 0 \quad V = 0$

$$0 = C - \frac{gm}{\mu}$$

$$C = \frac{gm}{\mu}$$

$$V = \frac{gm}{\mu} e^{-\frac{\mu}{m}t} - \frac{gm}{\mu}$$

$$V = \frac{gm}{\mu}\left(e^{-\frac{\mu t}{m}} - 1\right) \equiv$$

$$t \to \infty \qquad V = -\frac{gm}{\mu}$$