

```

0  ### -*- coding: cp1252 -*-
1  """
2  Étude de l'oscillateur de Van der Pol
3  """
4  from __future__ import division # pour éviter la division entière
5
6  from pylab import *
7  from scipy import *
8  from scipy.integrate import odeint
9
10 #initialisation
11 theta_ini = 0.01
12 omega_ini = 0
13 tini = 0
14 tfin = 100
15 Npas = 400
16 omega0 = 1
17 om2 = omega0**2
18 theta0 = 0.1
19
20 def F(Y, t, lam):
21     [theta, omega] = Y
22     eq1 = omega
23     eq2 = -om2*theta - lam*((theta/theta0)**2-1)*omega
24     return [eq1, eq2]
25
26 cond_ini = [theta_ini, omega_ini]
27 t = linspace(tini, tfin, Npas)
28 # régime quasi-sinusoïdal
29 lam = omega0/10
30 Yn = odeint(F, cond_ini, t, args=(lam, ))
31 [theta, omega] = Yn.T
32 plot(theta, omega, '-', color = 'b', label=ur'$\lambda = 0.1$')
33
34 # régime type relaxation
35 lam = omega0
36 Yn = odeint(F, cond_ini, t, args=(lam, ))
37 [theta, omega] = Yn.T
38 plot(theta, omega, '-', color = 'g', label=ur'$\lambda = 1$')
39
40 legend()
41
42 show()

```

