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0  ### -*- coding: cp1252 -*-
1  """
2  Étude de l'oscillateur harmonique sans dissipation
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 = 1
12 omega_ini = 0
13 tini = 0
14 tfin = 50
15 Npas = 400
16 omega0 = 1
17 om2 = omega0**2
18 #lam = 0.1
19
20 def F(Y, t, lam):
21     [theta, omega] = Y
22     eq1 = omega
23     eq2 = -om2*theta - 2*lam*omega*abs(omega)
24     return [eq1, eq2]
25
26 cond_ini = [theta_ini, omega_ini]
27 t = linspace(tini, tfin, Npas)
28 # régime 1
29 lam = omega0*1
30 Yn = odeint(F, cond_ini, t, args=(lam, ))
31 [theta, omega] = Yn.T
32 plot(t, theta, '-', color = 'b', label=ur'$\lambda = 1 \omega_0$')
33 # régime 2
34 lam = omega0*10
35 Yn = odeint(F, cond_ini, t, args=(lam, ))
36 [theta, omega] = Yn.T
37 plot(t, theta, '-', color = 'g', label=ur'$\lambda = 10 \omega_0$')
38 # régime 3
39 lam = omega0*100
40 Yn = odeint(F, cond_ini, t, args=(lam, ))
41 [theta, omega] = Yn.T
42 plot(t, theta, '-', color = 'r', label=ur'$\lambda = 100 \omega_0$')
43
44 legend()
45
46 show()

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