

Simple pendulum

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This is an simple pendulum system example. The focus here is more in learning a little o **Fortran** and **org-mode** great features for writting scientific documents (like export for **.pdf**).

1 Equations

$$\omega_{i+1} = w_i - \frac{g}{l} \cdot \theta_i \cdot \Delta t$$
$$\theta_{i+1} = \theta_i + \omega_i \cdot \Delta t$$

2 Fortran Code

```
1  implicit none
2  integer, parameter :: n = 500
3  real, parameter :: g = 9.81
4  real, parameter :: l = 1.0
5  real, dimension(n) :: w, t
6  real, dimension(n) :: theta
7  real, parameter :: dt = 0.02
8  integer :: i
9  theta(1) = 0.02
10 w(1) = 0
11 t(1) = 0
12 do i = 1, n-1
13     w(i+1) = w(i) - (g/l) * theta(i) * dt
14     theta(i+1) = theta(i) + w(i+1) * dt
15     t(i+1) = t(i) + dt
16 end do
17
18 do i = 1, n
19     print *, t(i) , theta(i)
20 end do
```

3 Plotting with Gnuplot

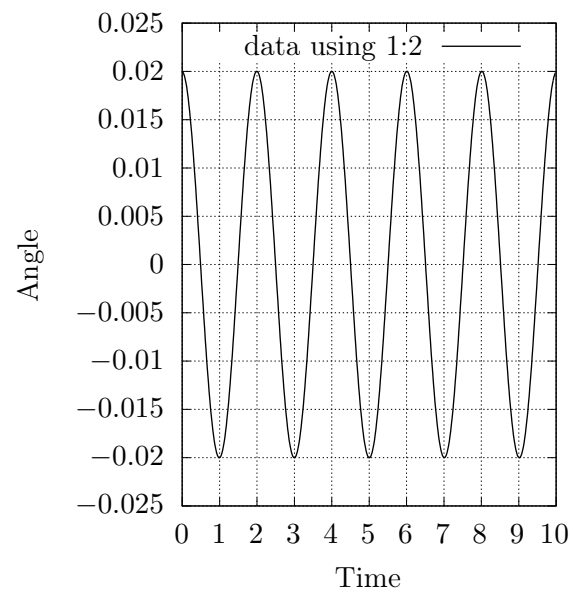


Figura 1: Gráfico da variação angular sobre o tempo.