Simple pendulum

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Conteúdo

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 System

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

$$\theta_{i+1} = \theta_i + \omega_i \cdot \Delta t$$

2 Fortran Code

```
implicit none
integer, parameter :: n = 500
real, parameter :: g = 9.81
real, parameter :: l = 1.0
real, dimension(n) :: w, t
real, dimension(n) :: theta
real, parameter :: dt = 0.02
integer :: i
theta(1) = 0.02
w(1) = 0
t(1) = 0
do i = 1, n-1
   w(i+1) = w(i) - (g/l) * theta(i) * dt
   theta(i+1) = theta(i) + w(i+1) * dt
   t(i+1) = t(i) + dt
end do

```

```
18 do i = 1, n
19    print *, t(i) ,  theta(i)
20 end do
```

3 Plotting with Gnuplot