1 MTH2210A-RAPPORT DE LABORATOIRE

Nom et Prenoms Matricule: 0000000 Groupe:00

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Date:

```
using Plots
using LinearAlgebra
using Printf
using Statistics
push!(LOAD_PATH,"C:\\Users\\Antonin\\Documents\\Antonin\\Maitrise\\MTH2210_codes\\New_codes\\MTH2210_J
using MTH2210_Julia
```

1.1 Exercice 1 - Quelques opérations simples

```
function question1()

# Vecteur allant de 1 à 23 par bond de 2
a = 1:2:23
b = a .^ 2

@printf("n a b\n");
for t=1:length(a)
    @printf("%2d %16.15e %16.15e\n",t,a[t],b[t])
end

return

end

question1()
```

```
n    a                       b
 1   1.000000000000000e+00   1.000000000000000e+00
 2   3.000000000000000e+00   9.000000000000000e+00
 3   5.000000000000000e+00   2.500000000000000e+01
 4   7.000000000000000e+00   4.900000000000000e+01
 5   9.000000000000000e+00   8.100000000000000e+01
 6   1.100000000000000e+01   1.210000000000000e+02
 7   1.300000000000000e+01   1.690000000000000e+02
 8   1.500000000000000e+01   2.250000000000000e+02
 9   1.700000000000000e+01   2.890000000000000e+02
10   1.900000000000000e+01   3.610000000000000e+02
11   2.100000000000000e+01   4.410000000000000e+02
12   2.300000000000000e+01   5.290000000000000e+02
```

```
# Un commentaire sur l'exercice 1
```

1.2 Exercice 2 - Affichage d'un graphique

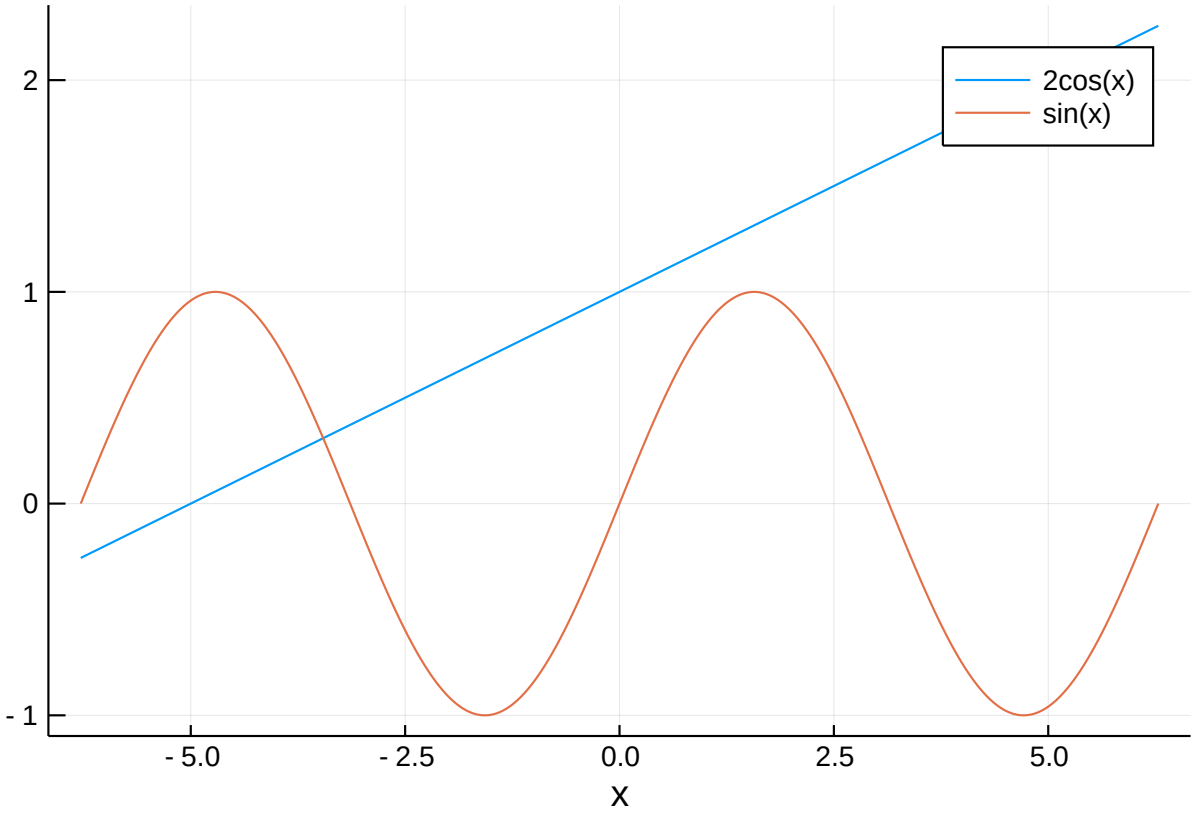
```
function question2()

x = LinRange(-2*pi,2*pi,1001)
y = 0.2 .* x .+ 1
y2 = sin.(x)

plot(x , y , label="2cos(x)")
plot!(x , y2 , label="sin(x)" , xlabel="x")

end

question2()
```



1.3 Exercice 3 - Création d'une fonction

```
function question3()

fct1 = function(x)
    z = sin(x)^2
    return z
end

# Appel de la fonction sur un float
resultat = fct1(2.0)

# Appel de la fonction pour des vecteurs de float
x = LinRange(-2*pi,2*pi,1001)
```

```
resultat2 = fct1.(x)

end

question3()
```

```
1001-element Array{Float64,1}:
 5.99903913064743e-32
 0.00015790535834999493
 0.0006315216969912742
 0.001420549869693093
 0.0025244915093499886
 0.00394264934276107
 0.005674127631043128
 0.007717832735397327
 0.010072473807876786
 0.012736563606711496
 ⋮
 0.010072473807876786
 0.007717832735397327
 0.005674127631043128
 0.00394264934276107
 0.0025244915093499886
 0.001420549869693093
 0.0006315216969912742
 0.00015790535834999493
 5.99903913064743e-32
```

1.4 Exercice 4 - Résolution EDOs

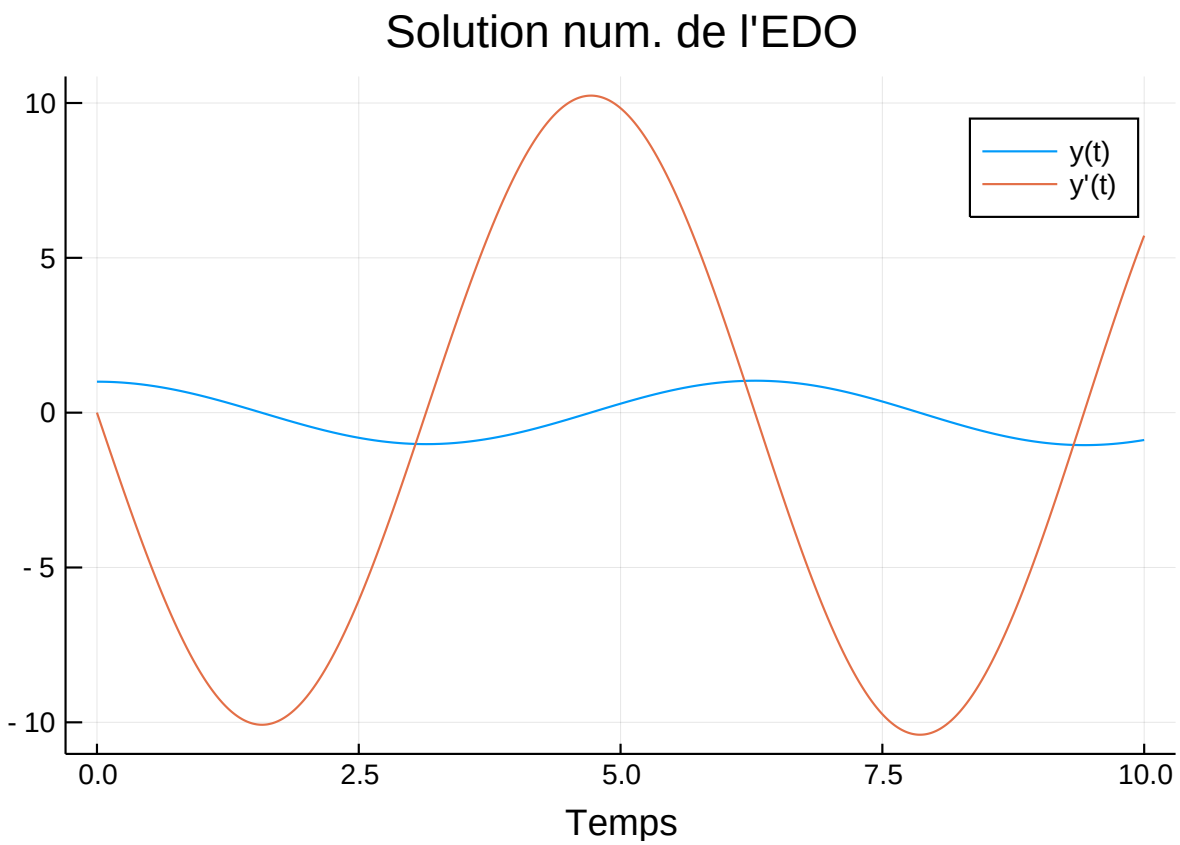
```
function question4()

function my_edo(t,z)
    f = zeros(length(z))
    f[1] = z[2]
    f[2] = -z[1]
    return f
end
(temps,y)   =   euler(my_edo , [0.;10.] , [1.;0.] , 1000)

plot(temps,y[:,1],label="y(t)")
plot!(temps,10 .* y[:,2],label="y'(t)",xlabel="Temps",title="Solution num.  de l'EDO")

end

question4()
```


Solution num. de l'EDO
10
5
0
- 5
- 10
0.0
2.5
5.0
7.5
10.0
Temps
y(t)
y'(t)