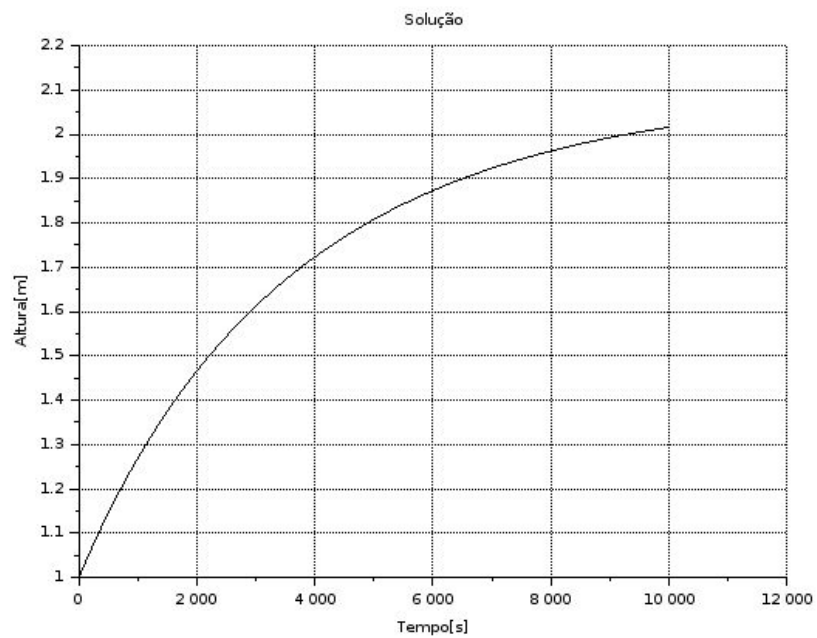
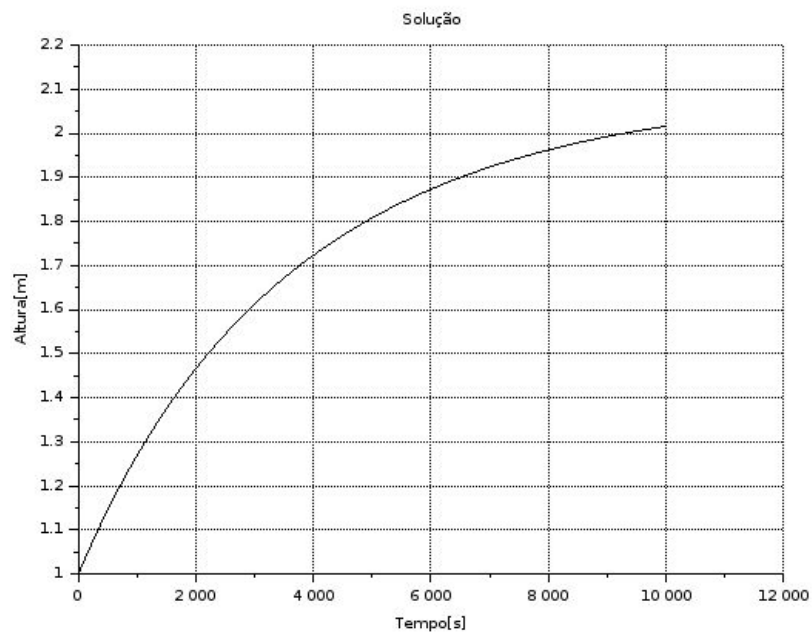


Lista B - Exercício 1

- Gráficos:
 1. Euler



2. Runge-Kutta



- Código:

1. funcao.sci(utilizado nos códigos 2 e 3)

```
clear
clc
R = 2*10^8;
S = 10;
g = 10;
rho = 1000;
Qe = 0.010247;
function [ydot] = funcao(y)
    ydot = (-sqrt(g*rho*y/R)+Qe)/S;
endfunction
```

2. euler1.sce

```
t(1)=0;
tf=10000;
y(1)=1;

h=0.2;
n=round(tf/h);

for i=1:n
    t(i+1)=t(i)+h;
    y(i+1)=y(i)+h*funcao(y(i));
end
plot2d(t,y);
xlabel("Solução","Tempo[s]","Altura[m]");
xgrid(1);
```

3. runge-kutta1.sce

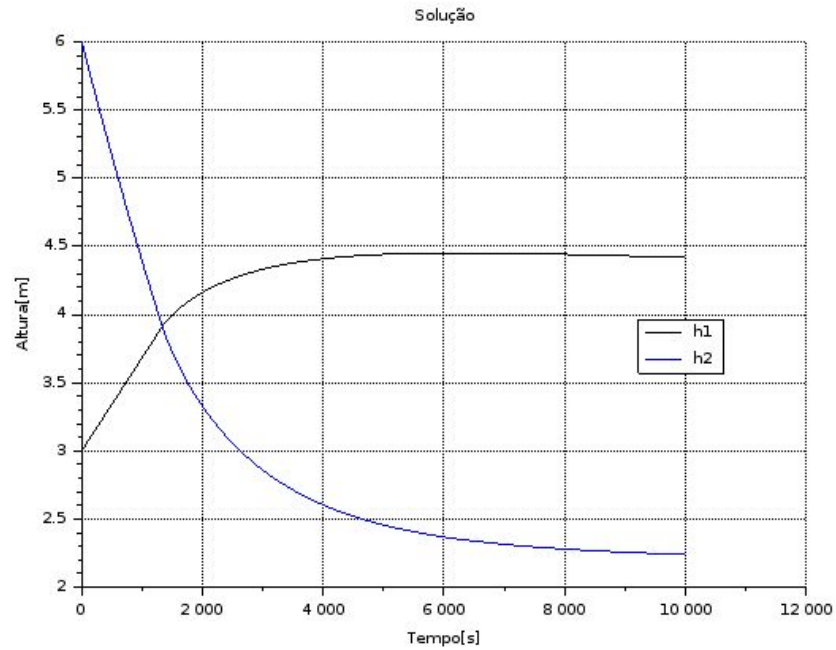
```
t(1)=0;
tf=10000;
y(1)=1;

h=0.2;
n=round(tf/h);

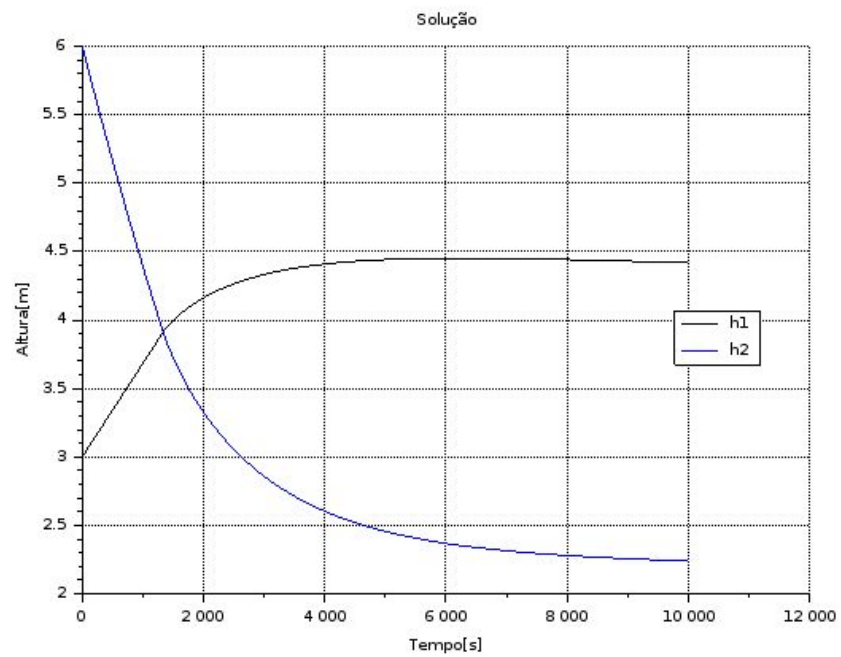
for i=1:n
    t(i+1)=t(i)+h;
    k1=funcao(y(i));
    k2=funcao(y(i)+k1*h/2);
    k3=funcao(y(i)+k2*h/2);
    k4=funcao(y(i)+k3*h);
    y(i+1)=y(i)+(h*(k1+2*k2+2*k3+k4)/6);
end
plot2d(t,y);
xlabel("Solução","Tempo[s]","Altura[m]");
xgrid(1);
```

Lista B - Exercício 2

- Gráficos:
 1. Euler



2. Runge-Kutta



- Código:

1. funcao2.sci(utilizado nos códigos 2 e 3)

```
clear
clc
R = 2*10^8;
S1 = 15;
S2 = 10;
g = 10;
rho = 1000;
Qe = 0.010247;
function [ydot] = funcao1(y1,y2)
    ydot = -(Qe-sqrt(g*rho*(y1-y2)/R))/S1;
endfunction
function [ydot] = funcao2(y1,y2)
    ydot = (sqrt(g*rho*(y1-y2)/R)-sqrt(g*rho*y2/R))/S2;
endfunction
```

2. euler2.sce

```
t(1)=0;
tf=10000;
y1(1)=3;
y2(1)=6;

h=0.2;
n=round(tf/h);

for i=1:n
    t(i+1)=t(i)+h;
    y1(i+1)=y1(i)+h*funcao1(y1(i),y2(i));
    y2(i+1)=y2(i)+h*funcao2(y1(i),y2(i));
end
plot2d([t,t],[y1,y2],[1,2]);
legends(["h1","h2"],[1,2]);
xtitle("Solução","Tempo[s]","Altura[m]");
xgrid(1);
```

3. runge-kutta2.sce

```
t(1)=0;
tf=10000;
y1(1)=3;
y2(1)=6;

h=0.2;
n=round(tf/h);

for i=1:n
    t(i+1)=t(i)+h;
    k11=funcao1(y1(i),y2(i));
    k12=funcao2(y1(i),y2(i));
    k21=funcao1(y1(i)+k11*h/2,y2(i)+k12*h/2);
    k22=funcao2(y1(i)+k11*h/2,y2(i)+k12*h/2);
    k31=funcao1(y1(i)+k21*h/2,y2(i)+k21*h/2);
    k32=funcao2(y1(i)+k21*h/2,y2(i)+k21*h/2);
    k41=funcao1(y1(i)+k31*h,y2(i)+k31*h);
    k42=funcao2(y1(i)+k31*h,y2(i)+k31*h);
    y1(i+1)=y1(i)+(h*(k11+2*k21+2*k31+k41)/6);
    y2(i+1)=y2(i)+(h*(k12+2*k22+2*k32+k42)/6);
end
plot2d([t,t],[y1,y2],[1,2]);
legends(["h1","h2"],[1,2]);
xtitle("Solução","Tempo[s]","Altura[m]");
xgrid(1);
```