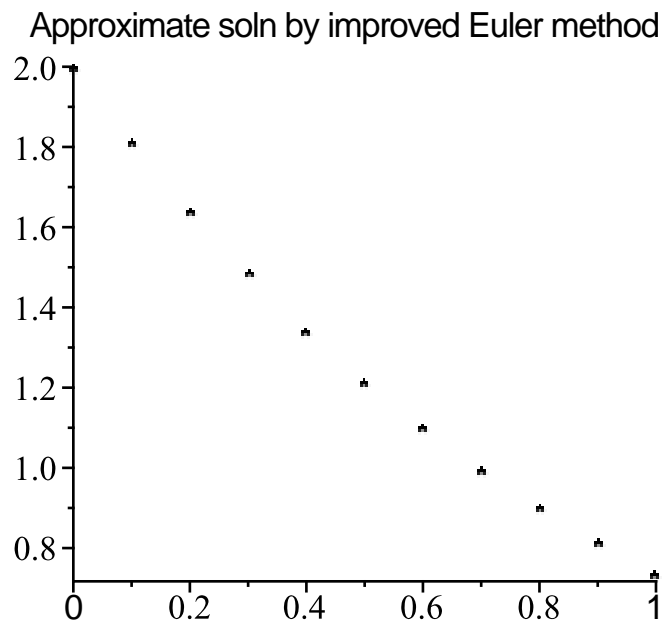


```

> # Improved Euler method
restart:Digits:=5: with(plots):with(linalg):
  f:=(x,y)->-y; x0:=0.0; y0:=2.0; # f(x,y) in DE dy/dx=-y
  # and initial condition - exact solution is y=2*exp(-x)
n:=10; xn:=1.0; h:=(xn-x0)/n; # make n=10 now
  xx:=vector(n+1): yy:=vector(n+1): xx[1]:=x0: yy[1]:=y0:
for i from 1 to n do
  x:=xx[i]: y:=yy[i]:
  xx[i+1]:=x+h: k1:=f(x,y):
  u:=y+h*k1:
  k2:=f(xx[i+1],u): k:=0.5*(k1+k2):
  yy[i+1]:=y+h*k:
od:
# now plot computed and exact solns
points:= {seq([xx[i],yy[i]],i=1..n+1) }:
pointplot(points,symbol=asterisk,
  title="Approximate soln by improved Euler method");
display(plot(2*exp(-t),t=0..1),pointplot(points),
  title="Exact and computed solns" );
  f:= (x,y) -> -y
  x0:= 0.
  y0:= 2.0
  n:= 10
  xn:= 1.0
  h:= 0.10000

```



Exact and computed solns

