Lecture 24

Thursday, March 20, 2025 1:04 PM

Euler's method is a numerical method for ODE $y' = f(x, y)$. A more general method based on the same idea is the *finite difference method*.
Example: $y' = xy$, $y(0) = 1$

Python code:

```
from numpy import *
from matplotlib.pyplot import *
# solve y'=xy with initial condition y(0)=y0
y0 = 1
# with step size h
h = 0.2
# the number of steps
N = 10
# Array x = [x0,x1,...,xN]
x = linspace(0,N*h,N+1)
# Array y = [y0,y1,...,yN]
y = zeros(N+1)
y[0] = y0
for i in range(N):
    y[i+1] = y[i] + h*x[i]*y[i]
print(x)
print(y)
plot(x,y)
show()
```