

Practical 3: Numerical Differentiation

Programming to obtain derivatives numerically.

Problem Statement: Write and execute Scilab code for the following:

From the following table of values of x and y obtain dy/dx for $x=1.2$

x	1	1.2	1.4	1.6	1.8	2	2.2
y	2.7183	3.3201	4.0552	4.953	6.0496	7.3891	9.025

Scilab Code:

```
clc;
clear;
x=[1.0 1.2 1.4 1.6 1.8 2.0 2.2];
y=[2.7183 3.3201 4.0552 4.9530 6.0496 7.3891 9.0250];
c=1;
for i=1:6
    d1(c)=y(i+1)-y(i);
    c=c+1;
end
c=1;
for i=1:5
    d2(c)=d1(i+1)-d1(i);
    c=c+1;
end
c=1;
for i=1:4
    d3(c)=d2(i+1)-d2(i);
    c=c+1;
end
c=1;
for i=1:3
    d4(c)=d3(i+1)-d3(i);
    c=c+1;
end
c=1;
```

```
for i=1:2
    d5(c)=d4(i+1)-d4(i);
    c=c+1;
end
c=1;
for i=1:1
    d6(c)=d5(i+1)-d5(i);
    c=c+1;
end
x0=1.2;
h=0.2;
f1=((d1(2)-d2(2)/2+d3(2)/3-d4(2)/4+d5(2)/5)/h);
printf('The first deviation of function at 1.2 is:%f\n',f1);
```

Output:

```
The first deviation of function at 1.2 is:3.320317
```