Numerical Calculation HW1

Sina barazandeh, Vahid Reza Niazmand

26 April 2019

1 Newton's Method

Matlab implementation of this algorithm is attached. In numerical analysis, Newton's method is a root-finding algorithm which produces successively better approximations to the roots (or zeroes) of a real-valued function.

The program takes a function, an initial guess value, and an arbitrary amount of allowed approximation error.

```
for i=1:100
  x(i+1)=x(i)-((f(x(i))/d(x(i))));
  err(i)=abs((x(i+1)-x(i))/x(i));
  if err(i)<error
    break
root=x(i)
```

As seen above, this process is repeated until it reaches an acceptable error(err(i)). Here is an example of an input and the calculated output.

Input :

$$f(x) = x^2 - 3, x_0 = 3, allowed - error = 0.1 \tag{1}$$

Output :

$$root = 1.9633 \tag{2}$$