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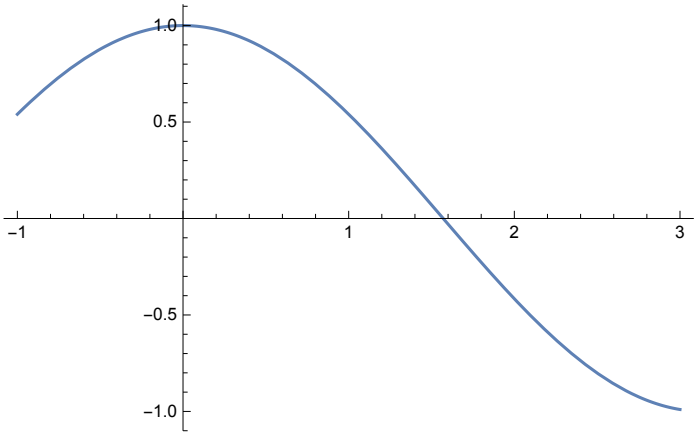
Course: Bsc. (h) Computer Science

NEWTON METHOD : BY TAKING PARAMETERS AS INPUT

```
x0 = Input["Enter initial guess:"];
Nmax = Input["Enter maximum number of iterations:"];
eps = Input["Enter the value of convergence parameters:"];
Print["x0=", x0];
Print["Nmax=", Nmax];
Print["Epsilon=", eps];
f[x_] := Cos[x];
Print["f'[x]:=", D[f[x], x]];
For[i = 1, i ≤ Nmax, i++, x1 = N[x0 - (f[x] /. x → x0) / (D[f[x], x] /. x → x0)];
  If[Abs[x1 - x0] < eps, Return[x1], x0p = x0; x0 = x1];
  Print["In", i,
   "th number of iterations the approximation to root is :", x1];
  Print["Estimated error is :", Abs[x1 - x0p]]];

Print["the final approximation of root is :", x1];
Print["Estimated error is :", Abs[x1 - x0]];
Plot[f[x], {x, -1, 3}]
```

```
x0=1

Nmax=20

Epsilon=1/1000000

f'[x]:=-Sin[x]

In1th number of iterations the approximation to root is :1.64209

Estimated error is :0.642093

In2th number of iterations the approximation to root is :1.57068

Estimated error is :0.0714173

In3th number of iterations the approximation to root is :1.5708

Estimated error is :0.00012105

Return[1.5708]

the final approximation of root is :1.5708

Estimated error is :5.91305×10^-13
```


1.0
0.5
−1
1
2
3
−0.5
−1.0