

UJUNWA FATIMA
COMPUTER ENGINEERING
16/ENG02/057

Code on matlab:

```
commandwindow
clear
clc
formatshortg
syms x
f(x)= (exp(-0.5*x))*((4-x))-2
g(x)= diff (f(x))
x=0.5
xf=x
for i= 1:20
    iter(i+1)=i
    x = double(subs(x-(f(x)/g(x))))
    xf(i+1)=x
    ea(i+1)= abs((xf(i+1)-xf(i))/xf(i+1))*100
    if ea>=1E-9
        break
    end
end
tab=[iter' xf' ea']
```

Output:

$f(x) =$

$- \exp(-x/2)*(x - 4) - 2$

$g(x) =$

$(\exp(-x/2)*(x - 4))/2 - \exp(-x/2)$

x =

0.5

xf =

K 0.5

iter =

0 1

x =

0.83889

xf =

0.5 0.83889

ea =

0 40.397

iter =

0 1 2

x =

0.88496

xf =

0.5 0.83889 0.88496

ea =

0 40.397 5.2054

iter =

0 1 2 3

x =

0.88571

xf =

0.5 0.83889 0.88496 0.88571

ea =

0 40.397 5.2054 0.084972

iter =

0 1 2 3 4

x =

0.88571

xf =

0.5 0.83889 0.88496 0.88571 0.88571

ea =

```
0    40.397    5.2054    0.084972    2.2247e-05
```

iter =

```
0    1    2    3    4    5
```

x =

```
0.88571
```

xf =

```
0.5    0.83889    0.88496    0.88571    0.88571    0.88571
```

ea =

```
0    40.397    5.2054    0.084972    2.2247e-05    1.5293e-12
```

iter =

```
0    1    2    3    4    5    6
```

x =

0.88571

xf =

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571

ea =

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0

iter =

0 1 2 3 4 5 6 7

x =

0.88571

xf =

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571

ea =

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0
---	--------	--------	----------	------------	------------	---	---

iter =

0	1	2	3	4	5	6	7	8
---	---	---	---	---	---	---	---	---

x =

0.88571

xf =

0.5	0.83889	0.88496	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
-----	---------	---------	---------	---------	---------	---------	---------	---------

ea =

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

iter =

0	1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---	---

x =

0.88571

xf =

Columns 1 through 9

0.5	0.83889	0.88496	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
-----	---------	---------	---------	---------	---------	---------	---------	---------

Column 10

0.88571

ea =

Columns 1 through 9

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

Column 10

0

iter =

0 1 2 3 4 5 6 7 8 9 10

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 11

0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 11

0 0

iter =

0 1 2 3 4 5 6 7 8 9 10 11

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 12

0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 12

0 0 0

iter =

0 1 2 3 4 5 6 7 8 9 10 11 12

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 13

0.88571 0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

Columns 10 through 13

0	0	0	0
---	---	---	---

iter =

0	1	2	3	4	5	6	7	8	9	10	11	12	13
---	---	---	---	---	---	---	---	---	---	----	----	----	----

x =

0.88571

xf =

Columns 1 through 9

0.5	0.83889	0.88496	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
-----	---------	---------	---------	---------	---------	---------	---------	---------

Columns 10 through 14

0.88571	0.88571	0.88571	0.88571	0.88571
---------	---------	---------	---------	---------

ea =

Columns 1 through 9

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

Columns 10 through 14

0	0	0	0	0
---	---	---	---	---

iter =

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----

x =

0.88571

xf =

Columns 1 through 9

0.5	0.83889	0.88496	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
-----	---------	---------	---------	---------	---------	---------	---------	---------

Columns 10 through 15

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 15

0 0 0 0 0 0

iter =

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 16

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 16

0 0 0 0 0 0 0

iter =

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 17

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 17

0 0 0 0 0 0 0 0

iter =

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

x =

0.88571

xf =

Columns 1 through 9

0.5	0.83889	0.88496	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
-----	---------	---------	---------	---------	---------	---------	---------	---------

Columns 10 through 18

0.88571	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571	0.88571
---------	---------	---------	---------	---------	---------	---------	---------	---------

ea =

Columns 1 through 9

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

Columns 10 through 18

0	0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---

iter =

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
---	---	---	---	---	---	---	---	---	---	----	----	----	----	----	----	----	----	----

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 18

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Column 19

0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 18

0 0 0 0 0 0 0 0 0

Column 19

0

iter =

Columns 1 through 19

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Column 20

19

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 18

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 19 through 20

0.88571 0.88571

ea =

Columns 1 through 9

0 40.397 5.2054 0.084972 2.2247e-05 1.5293e-12 0 0 0

Columns 10 through 18

0 0 0 0 0 0 0 0 0

Columns 19 through 20

0 0

iter =

Columns 1 through 19

0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Columns 20 through 21

19 20

x =

0.88571

xf =

Columns 1 through 9

0.5 0.83889 0.88496 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 10 through 18

0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571 0.88571

Columns 19 through 21

0.88571 0.88571 0.88571

ea =

Columns 1 through 9

0	40.397	5.2054	0.084972	2.2247e-05	1.5293e-12	0	0	0
---	--------	--------	----------	------------	------------	---	---	---

Columns 10 through 18

0	0	0	0	0	0	0	0	0
---	---	---	---	---	---	---	---	---

Columns 19 through 21

0	0	0
---	---	---

tab =

0	0.5	0
1	0.83889	40.397
2	0.88496	5.2054
3	0.88571	0.084972
4	0.88571	2.2247e-05
5	0.88571	1.5293e-12
6	0.88571	0
7	0.88571	0
8	0.88571	0
9	0.88571	0
10	0.88571	0
11	0.88571	0
12	0.88571	0
13	0.88571	0
14	0.88571	0
15	0.88571	0

16	0.88571	0
17	0.88571	0
18	0.88571	0
19	0.88571	0
20	0.88571	0