Edilbert Christhuraj

Matr.Numr 374762

Numerical Methods for PDE

Assignment -7

Problem statement

For the Given problem i have to create a program that tests the conditions for both mesh points (N=100 and 1000) and i have to create a plot for Error valuesof both meshes.

Solution :

i have a created a source codes(c files) namely pde7.c (

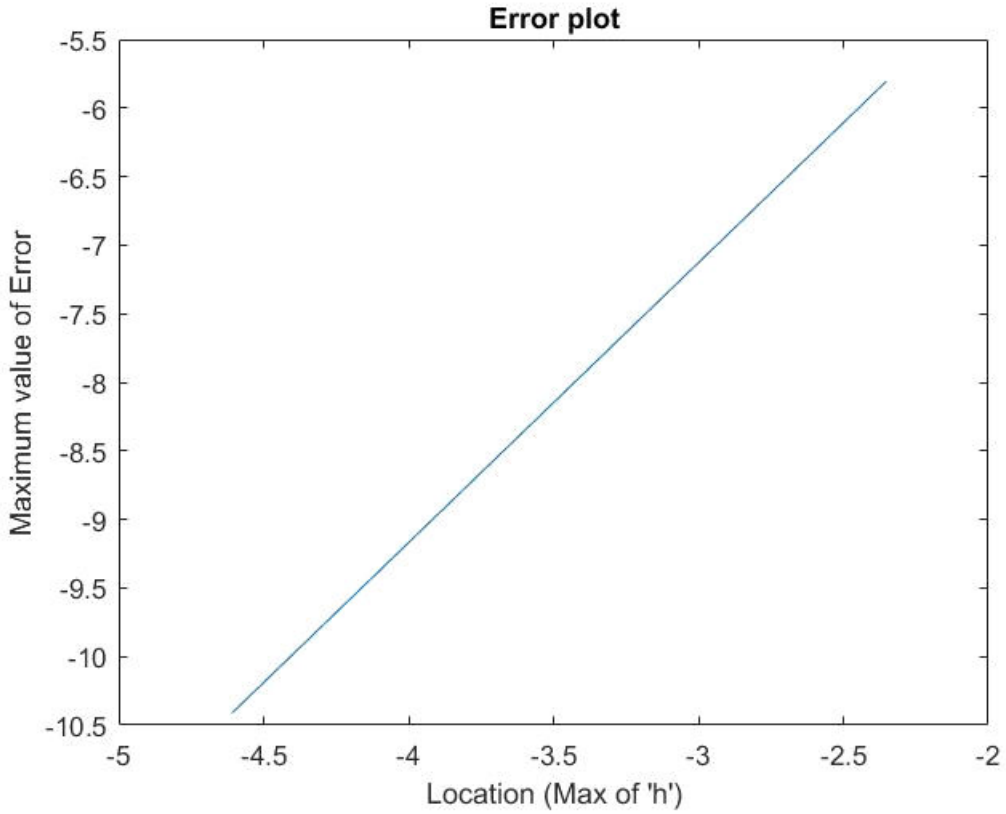
" pde7.c " file

when the user runs the program, it asks the user to enter the number of grid point in the mesh. After entering the values100 and 1000 (one at a time), the program will print the values for Error and location of the errors, using those values and plotted the following graph using MATLAB.

Screenshot values for Meshes N=100,200,400,600,800,1000.

```
edilbert@edilbert-VirtualBox:~$ cd Desktop
edilbert@edilbert-VirtualBox:~/Desktop$ gcc -o pde pde.c -lm
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
100
_____________________________________________________________
Error                   Location
 0.003010               0.095167
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
200
_____________________________________________________________
Error                   Location
 0.000755               0.048773
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
400
_____________________________________________________________
Error                   Location
 0.000189               0.024691
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
600
_____________________________________________________________
Error                   Location
 0.000084               0.016529
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
800
_____________________________________________________________
Error                   Location
 0.000047               0.012423
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$ ./pde
Enter the Number of Grid:
1000
_____________________________________________________________
Error                   Location
 0.000030               0.009951
_____________________________________________________________
edilbert@edilbert-VirtualBox:~/Desktop$
```

Error vs Location of error graph.


Error plot
Maximum value of Error
-5.5
-6
-6.5
-7
-7.5
-8
-8.5
-9
-9.5
-10
-10.5
-5
-4.5
-4
-3.5
-3
-2.5
-2
Location (Max of 'h')