.M file for change as per problem
1.inputdata.m for no of element ,Reynolds no. tolerance
2.boundaryCondition.m
****

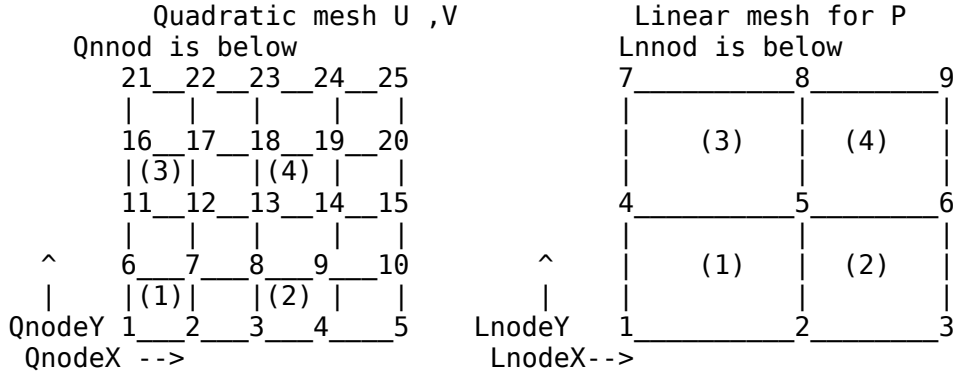
flow chart of program

Main file **fluidflow.m**

1 **Input data**
2 **notification**
3 **boundary condition**
4 **Driver**
- 4.1 **continuity equation**
- 4.2 **momentum equation**
- 4.3 **boundary application on residue and Jacobi**
- 4.4 **error calculation**

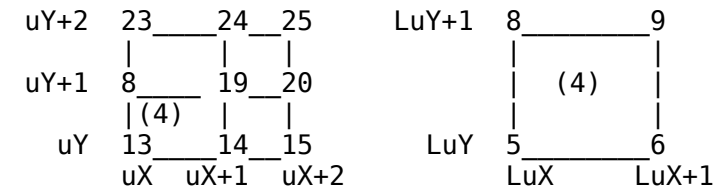
5 **vorticity**
6 **stream function**
7 **all plots**

Program illustration for 2X2 element



for each element=>> let for 4th element
in program we work in each loop from element to element to x direction
each element we use for quadratic mesh uX,uY initial both are one
uX=uX+2 for next element in X direction uY =uY+2 in y direction
similarly for linear mesh we us LuX,LuY which increase by unity in x and y direction

for 4th element uX,uY=3,3 LuX ,LuY=2,2
for node tracking



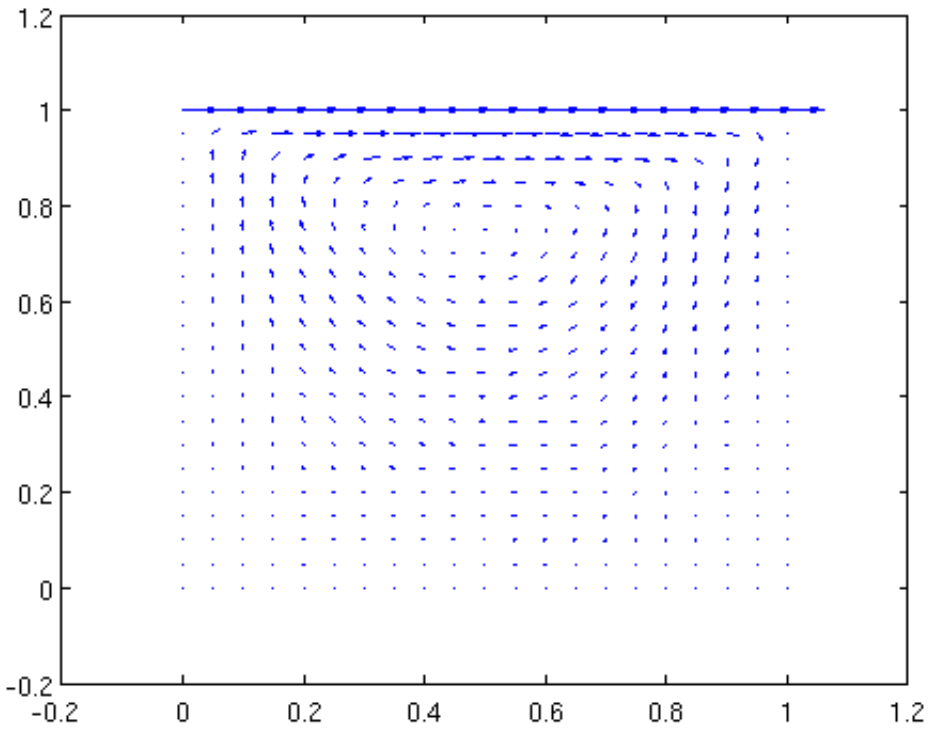
notification
Reynolds number NRe
tolerance tol

	quadratic	Linear
element in x	nX	nX
element in Y	nY	nY
mesh point in x,y	X,Y	
node in x,y	QnodeX ,QnodeY	LnodeX ,LnodeY

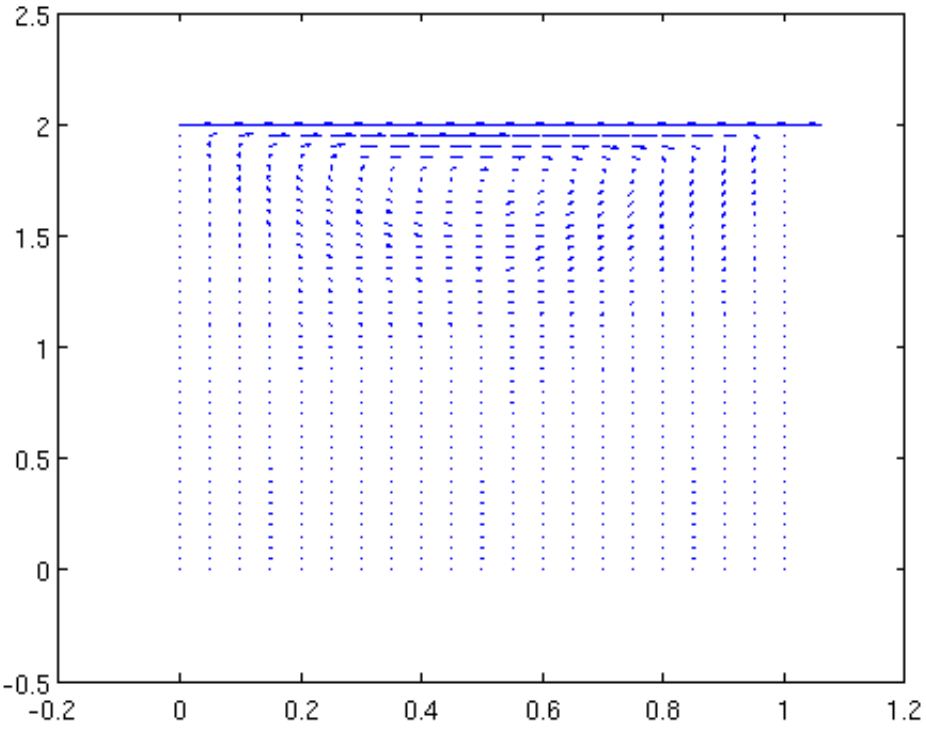
```
total node in x,y     tQnodeX ,tQnodeY       tLnodeX ,tLnodeY
tracked node number     Qnnod                  Lnnod

 vorticity               omega
stream function value     streamline
Pressure                     P
velocity in x,y            U,Y and lower and upper case
combined     for Gauss elimination  uvp   which are [U;V;P]
```

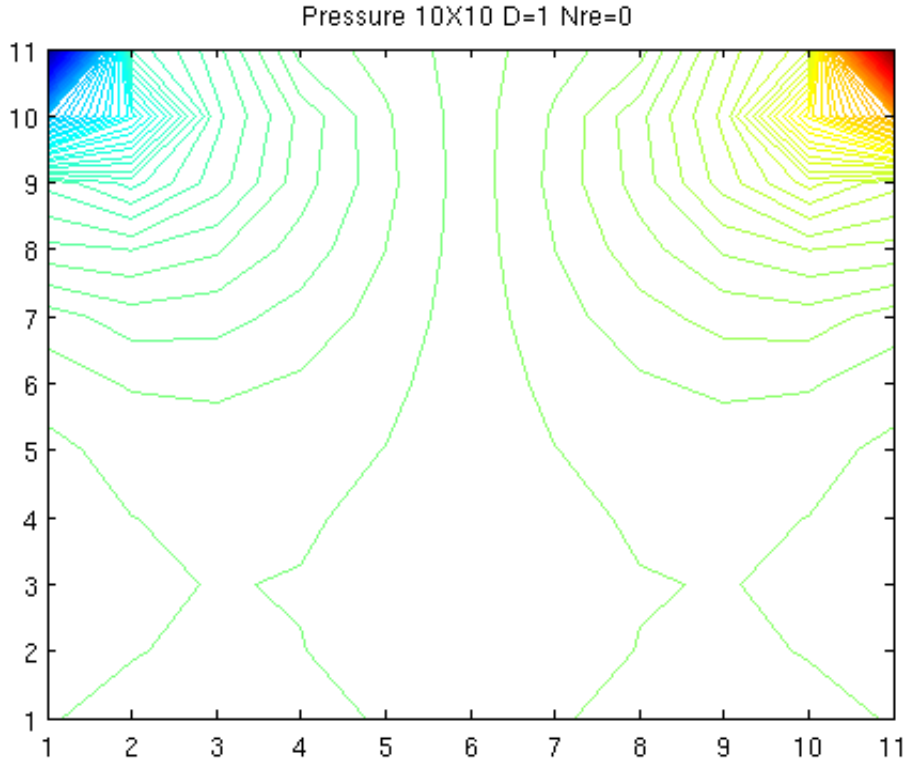
Question answers
Problem 1;

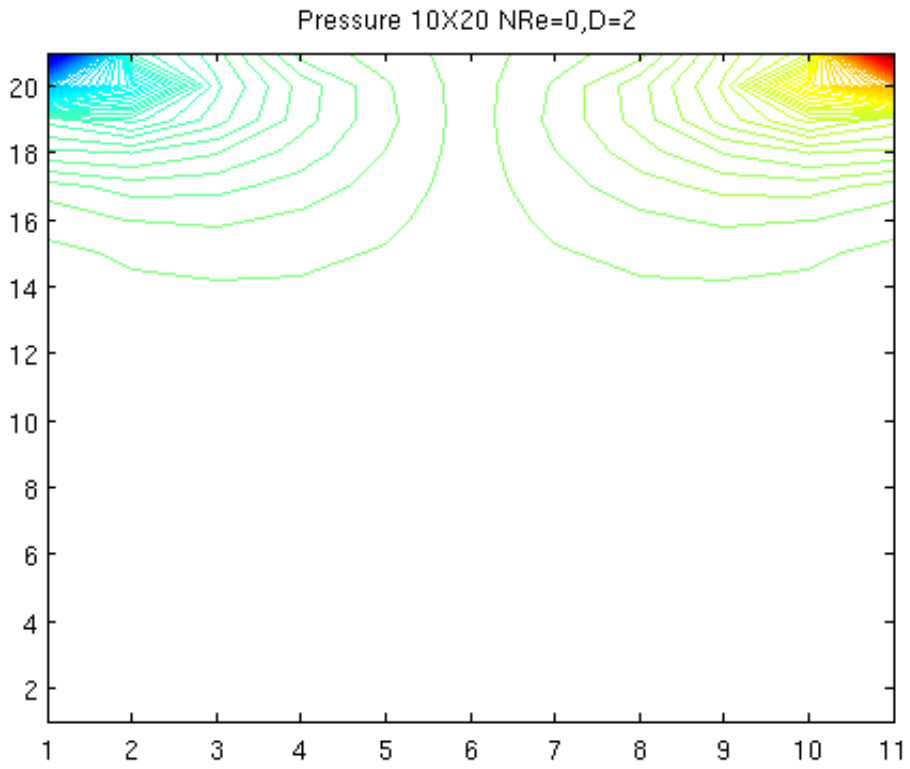
velocity vector for 10X10

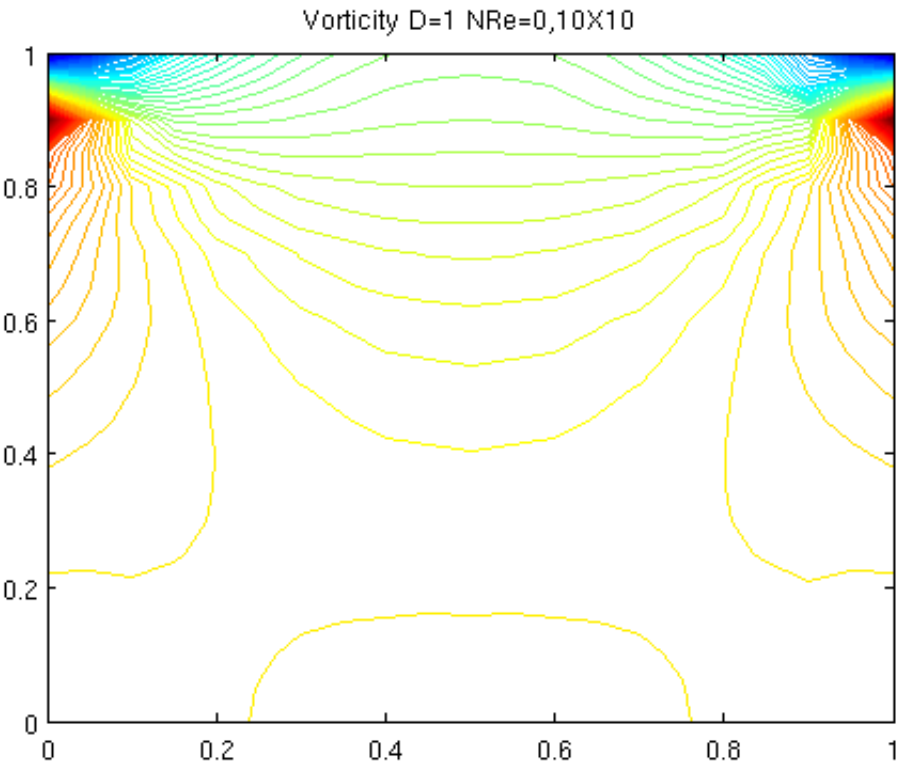


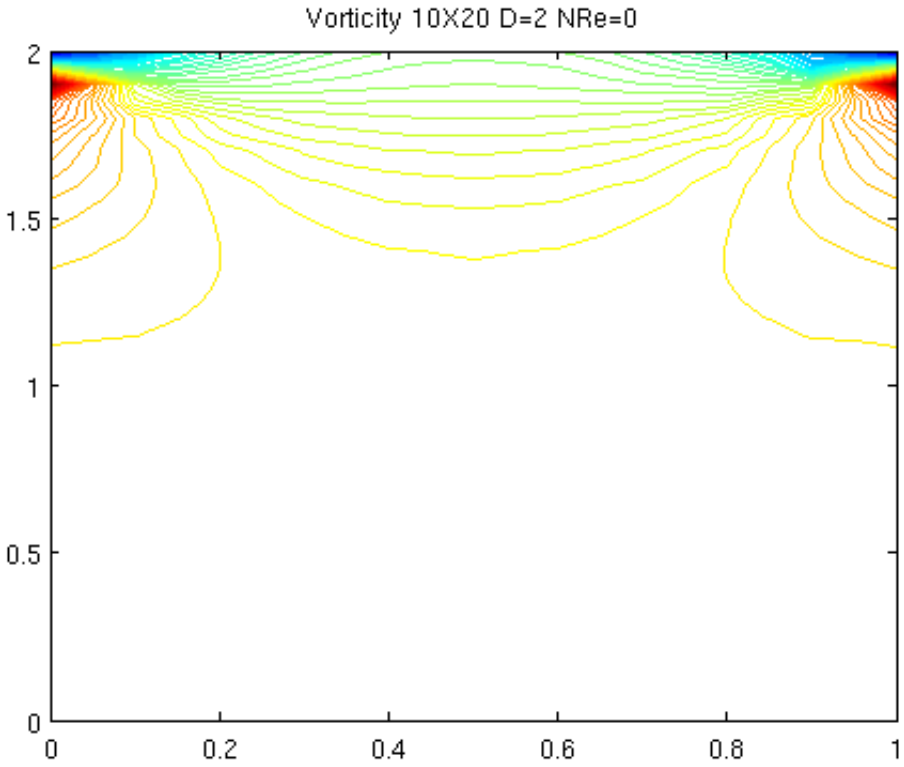
velocity vectors for 10X20

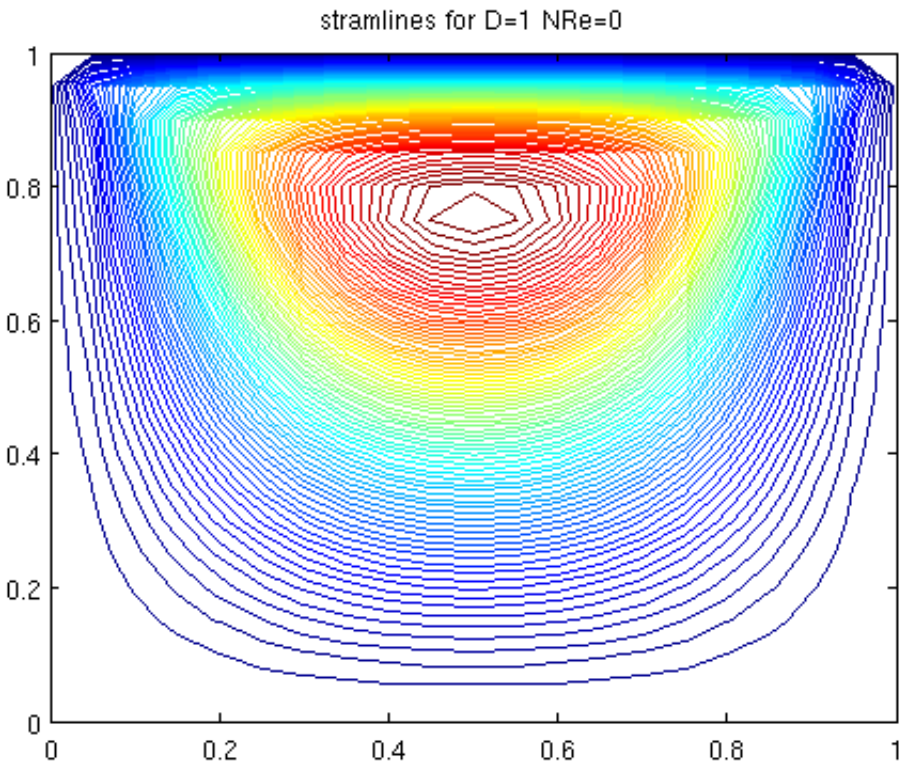

2.5
2
1.5
1
0.5
0
-0.5
-0.2
0
0.2
0.4
0.6
0.8
1
1.2

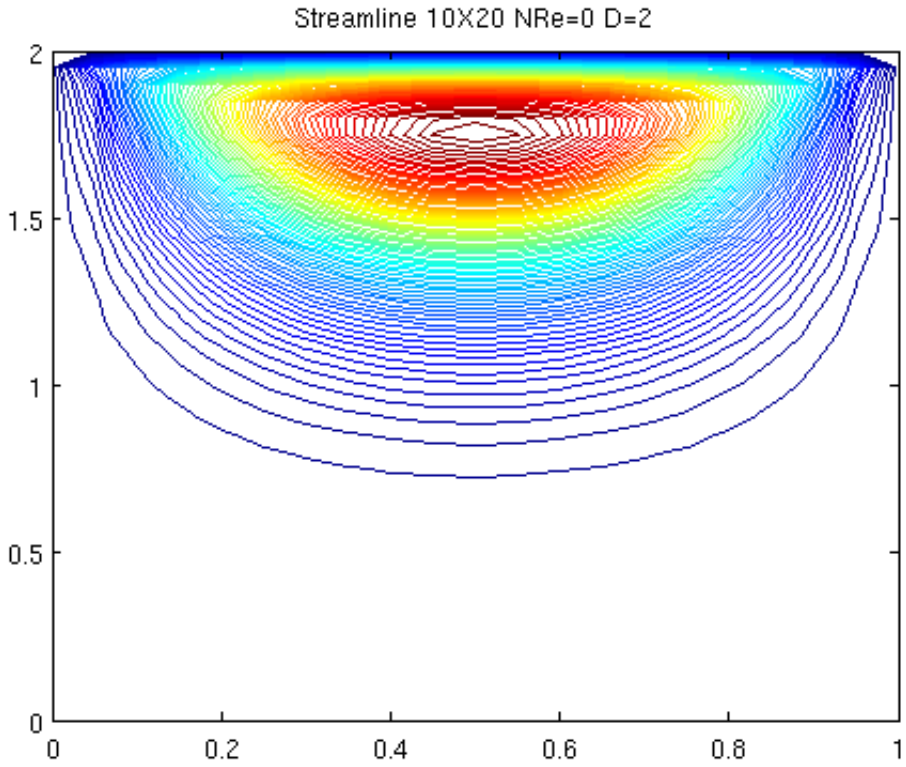

Pressure 10X10 D=1 Nre=0
11
10
9
8
7
6
5
4
3
2
1
1
2
3
4
5
6
7
8
9
10
11


Pressure 10X20 NRe=0,D=2
20
18
16
14
12
10
8
6
4
2
1
2
3
4
5
6
7
8
9
10
11

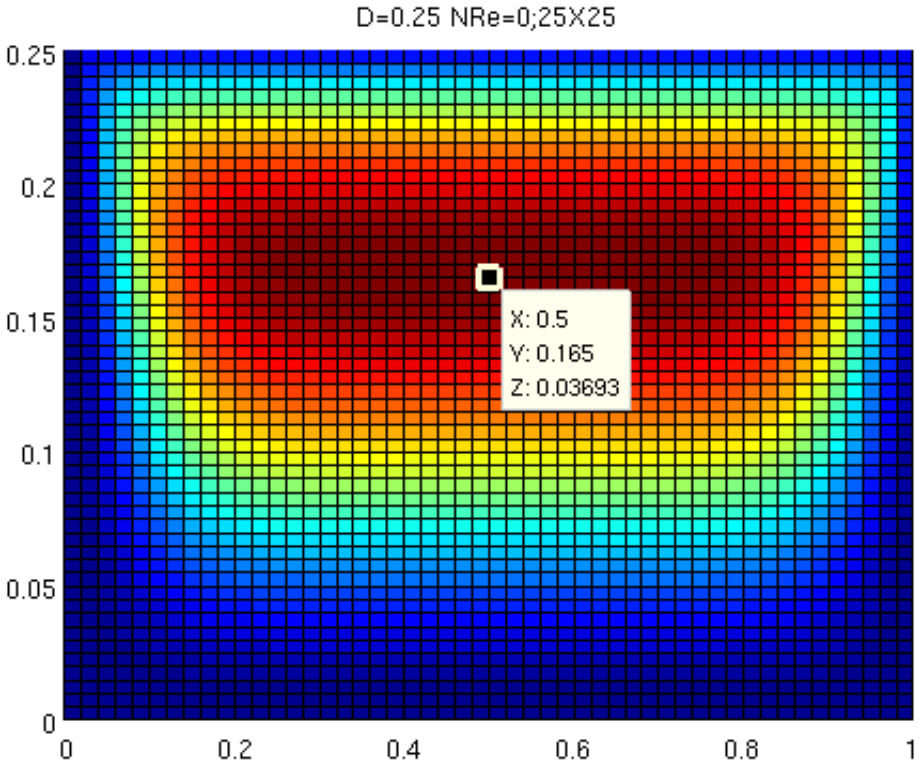

Vorticity D=1 NRe=0,10X10
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1

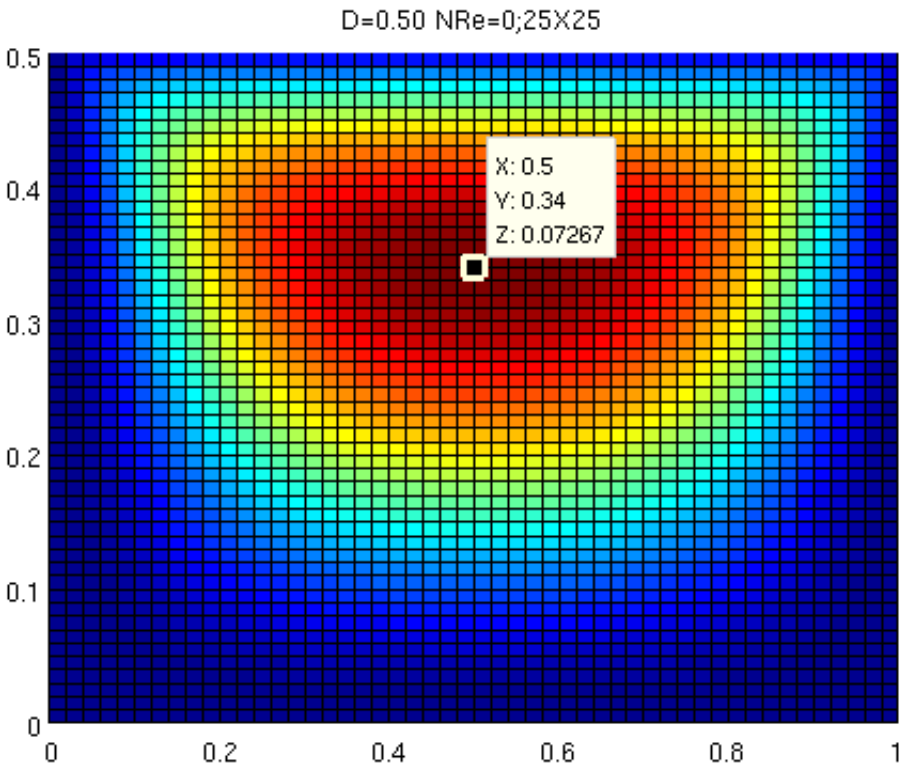

Vorticity 10X20 D=2 NRe=0
2
1.5
1
0.5
0
0
0.2
0.4
0.6
0.8
1

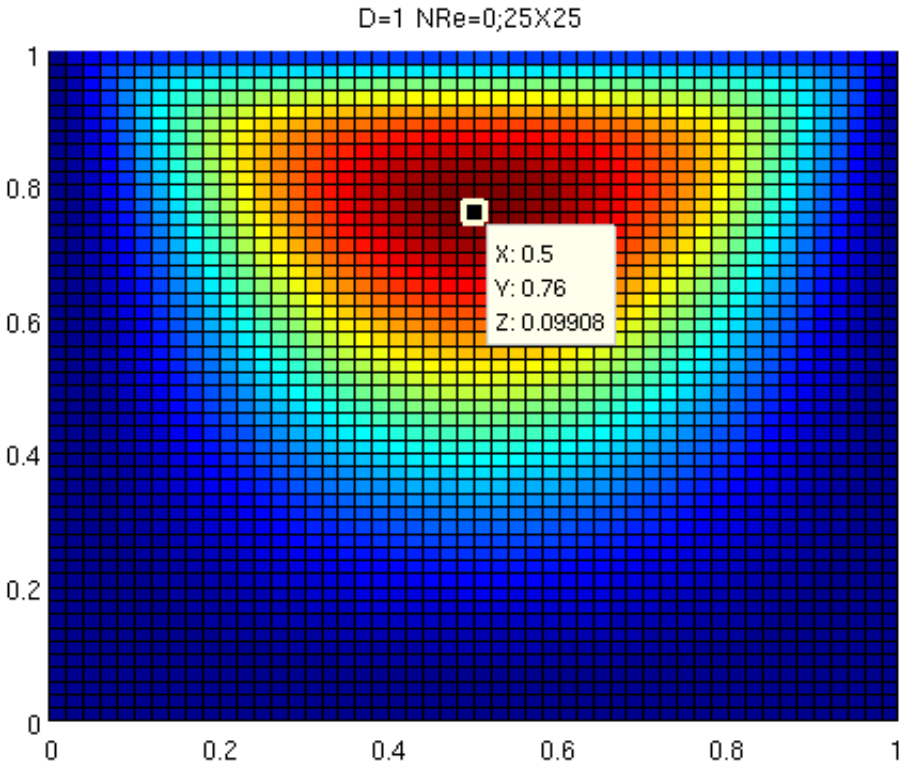

stramlines for D=1 NRe=0
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1

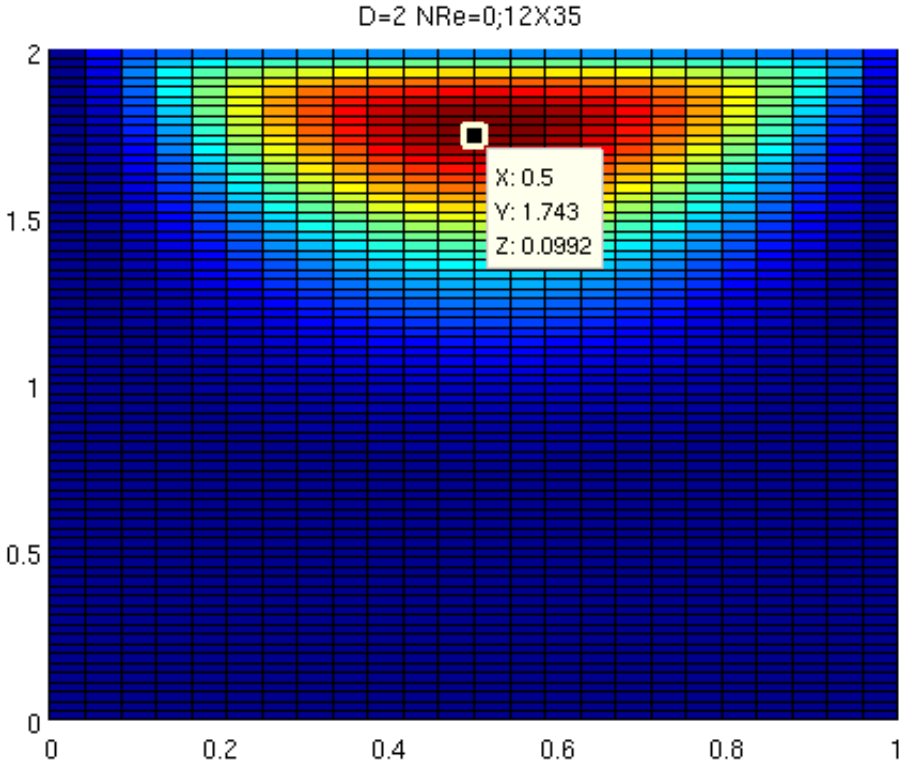


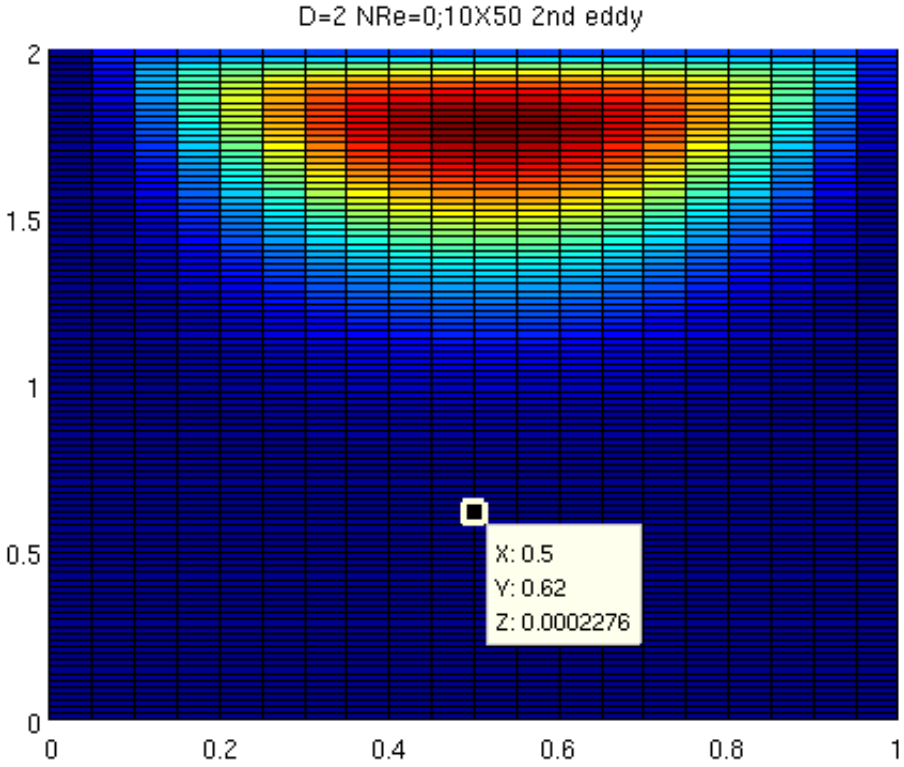
comparison with paper

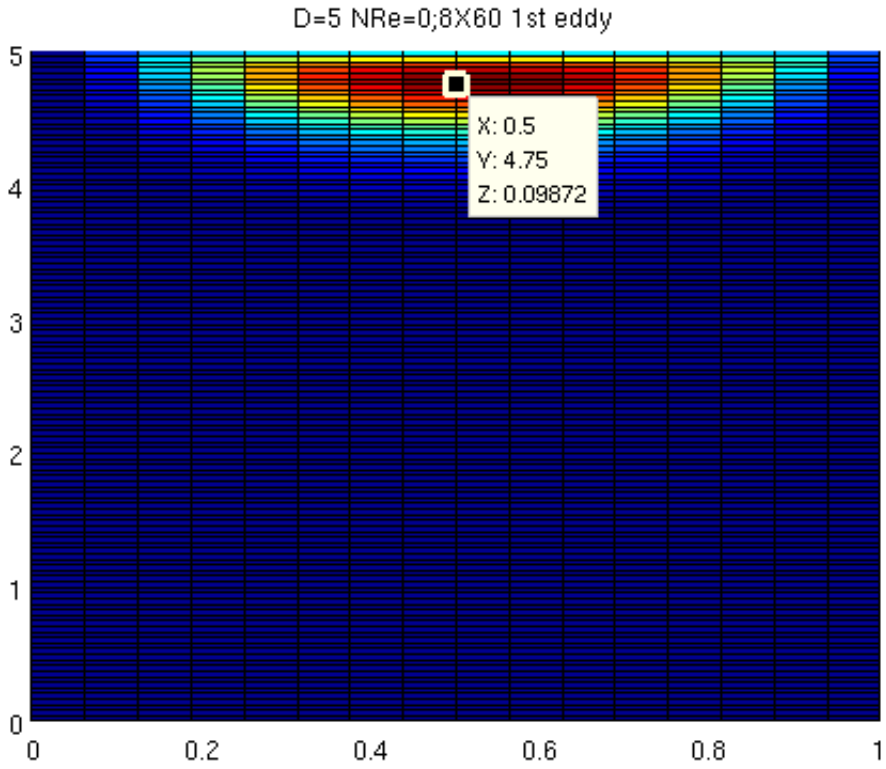


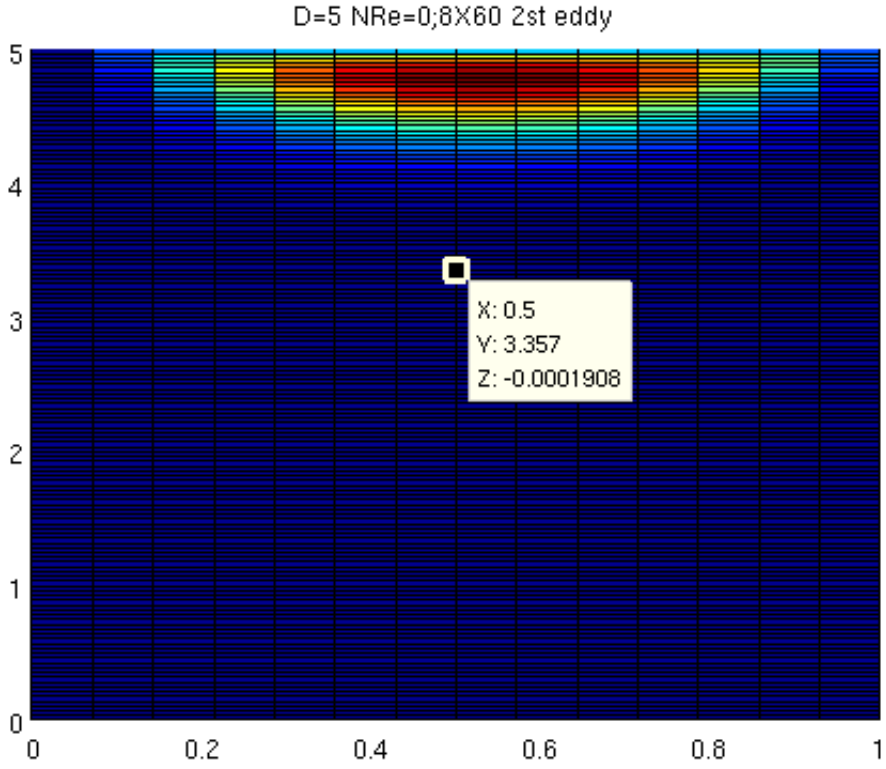

D=0.50 NRe=0;25X25
X: 0.5
Y: 0.34
Z: 0.07267
0.5
0.4
0.3
0.2
0.1
0
0
0.2
0.4
0.6
0.8
1

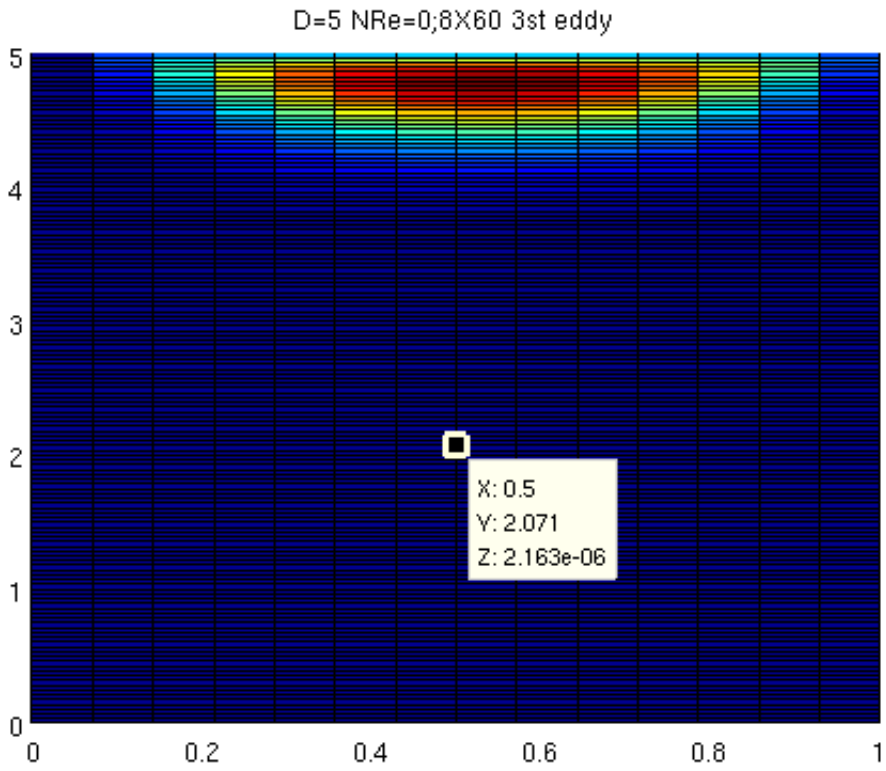

D=1 NRe=0;25X25
X: 0.5
Y: 0.76
Z: 0.09908
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1

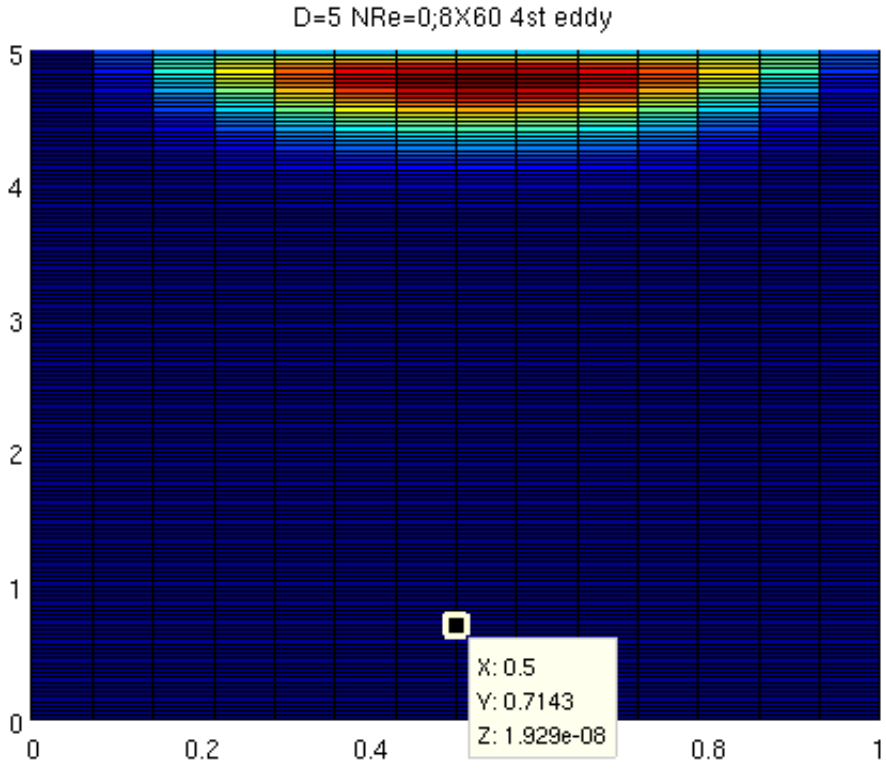

D=2 NRe=0;12X35
X: 0.5
Y: 1.743
Z: 0.0992
2
1.5
1
0.5
0
0
0.2
0.4
0.6
0.8
1


D=2 NRe=0;10X50 2nd eddy
X: 0.5
Y: 0.62
Z: 0.0002276
2
1.5
1
0.5
0
0
0.2
0.4
0.6
0.8
1

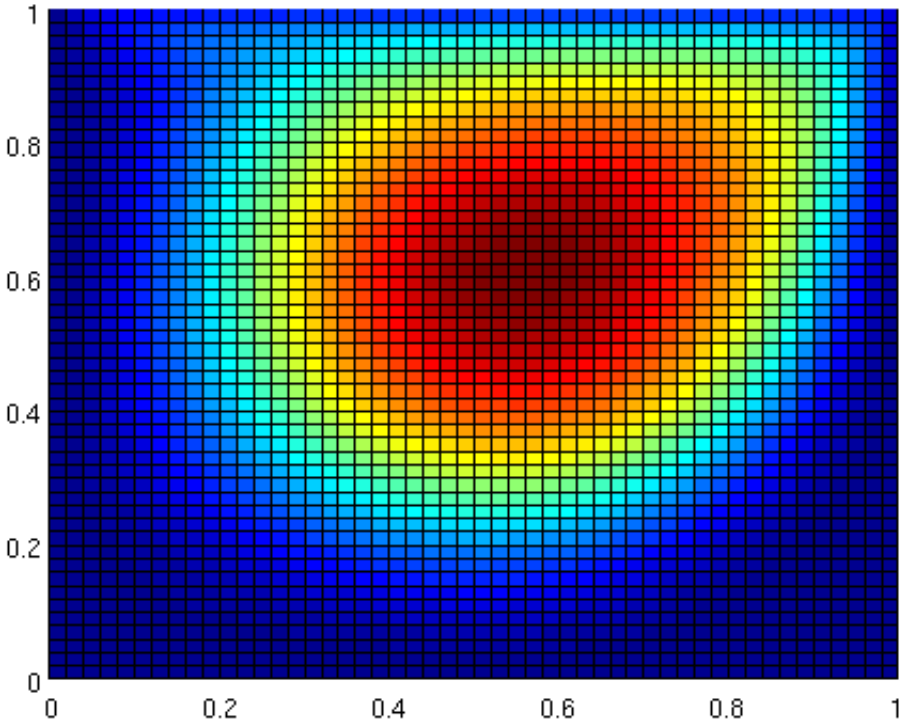

D=5 NRe=0;8X60 1st eddy
X: 0.5
Y: 4.75
Z: 0.09872
5
4
3
2
1
0
0
0.2
0.4
0.6
0.8
1


D=5 NRe=0;8X60 2st eddy
X: 0.5
Y: 3.357
Z: -0.0001908
5
4
3
2
1
0
0
0.2
0.4
0.6
0.8
1

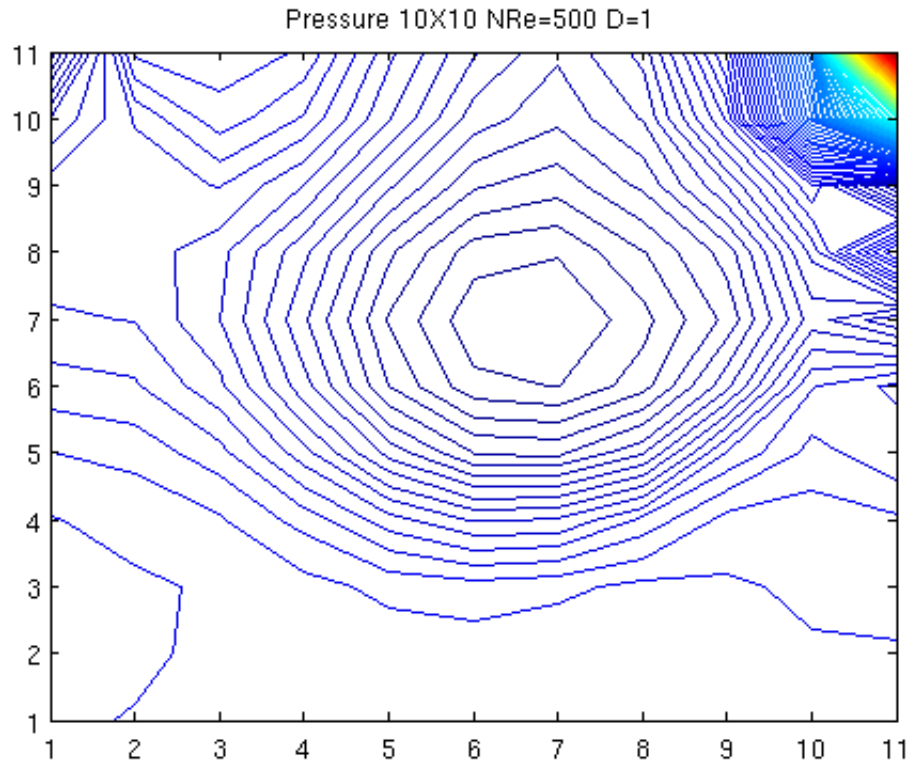

D=5 NRe=0;8X60 3st eddy
5
4
3
2
1
0
0
0.2
0.4
0.6
0.8
1
X: 0.5
Y: 2.071
Z: 2.163e-06

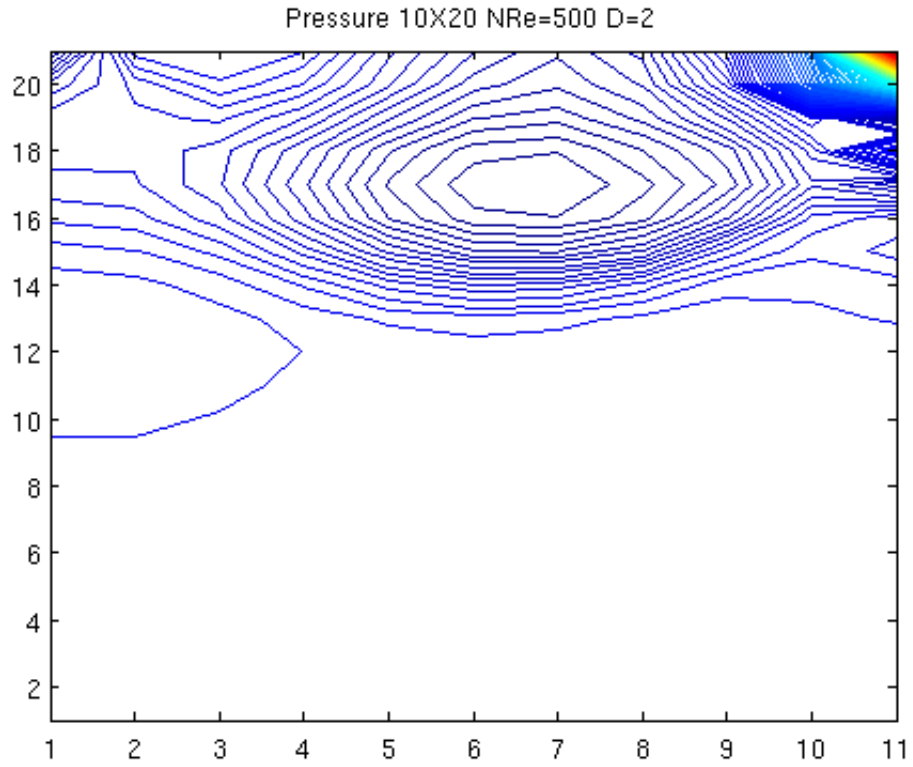

D=5 NRe=0;8X60 4st eddy
5
4
3
2
1
0
0
0.2
0.4
0.8
1
X: 0.5
Y: 0.7143
Z: 1.929e-08

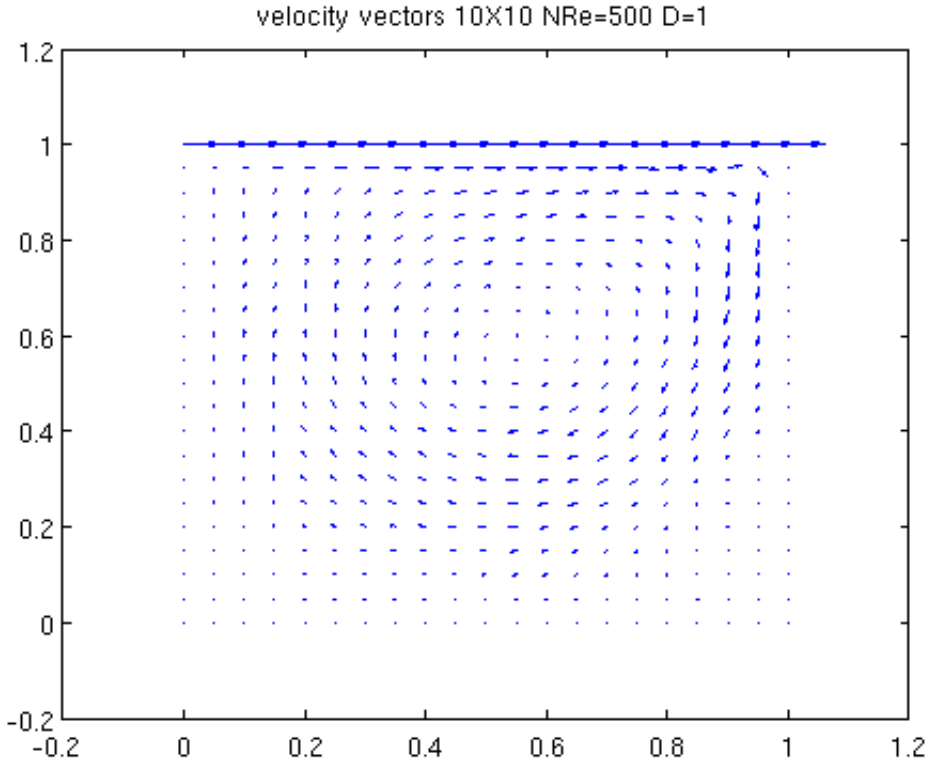
Problem 2 maximum Reynolds number for 25X25 mesh is 500

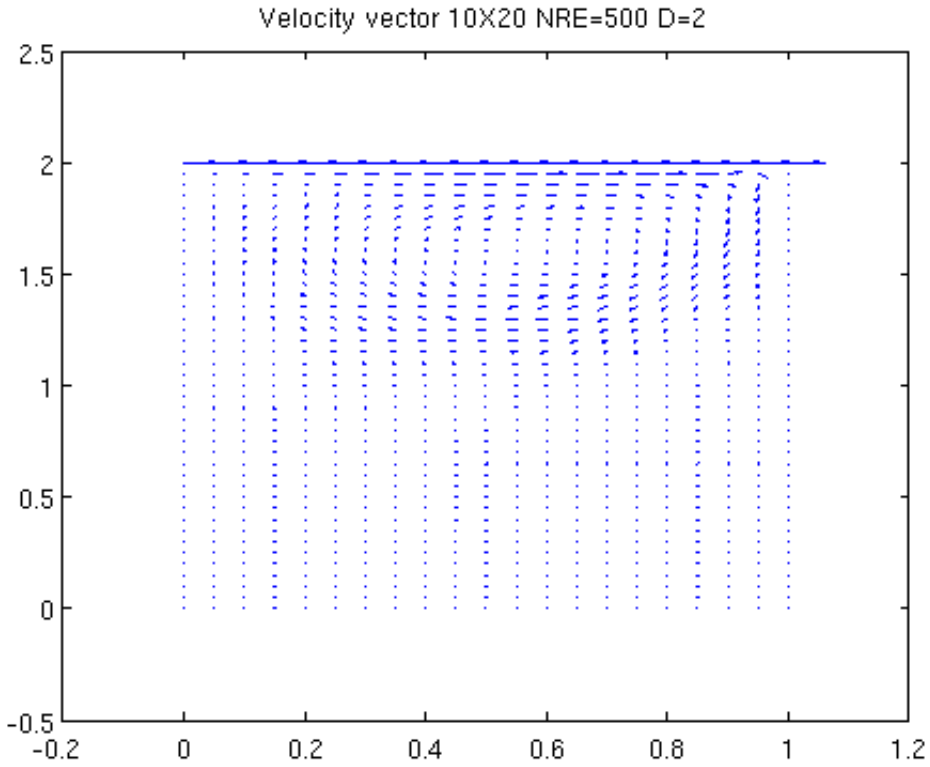


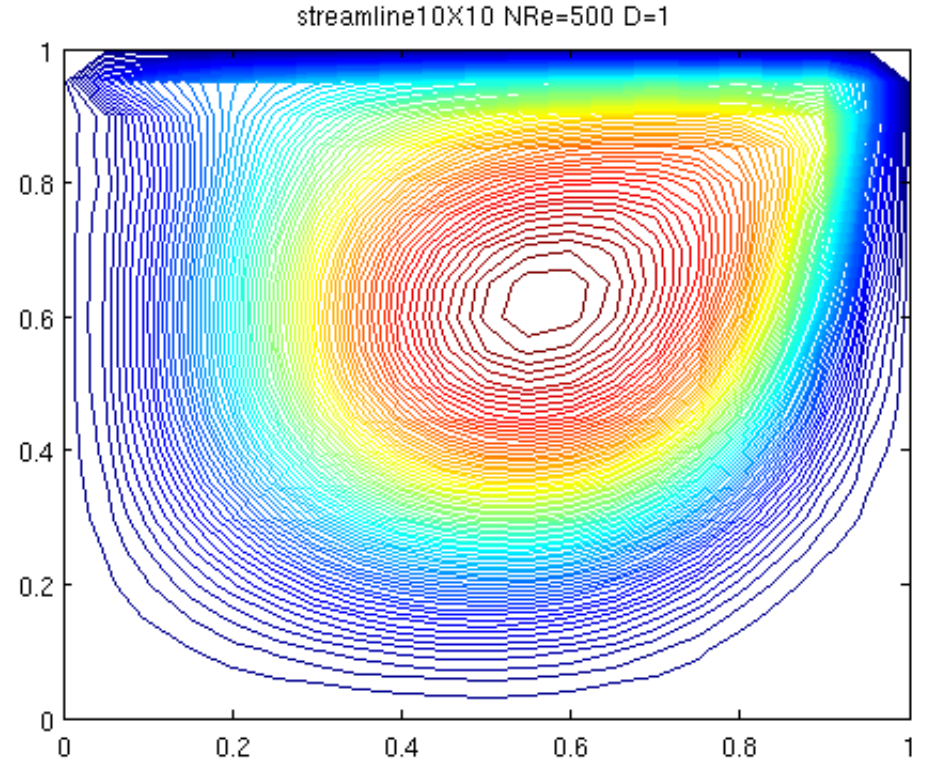
problem 3rd

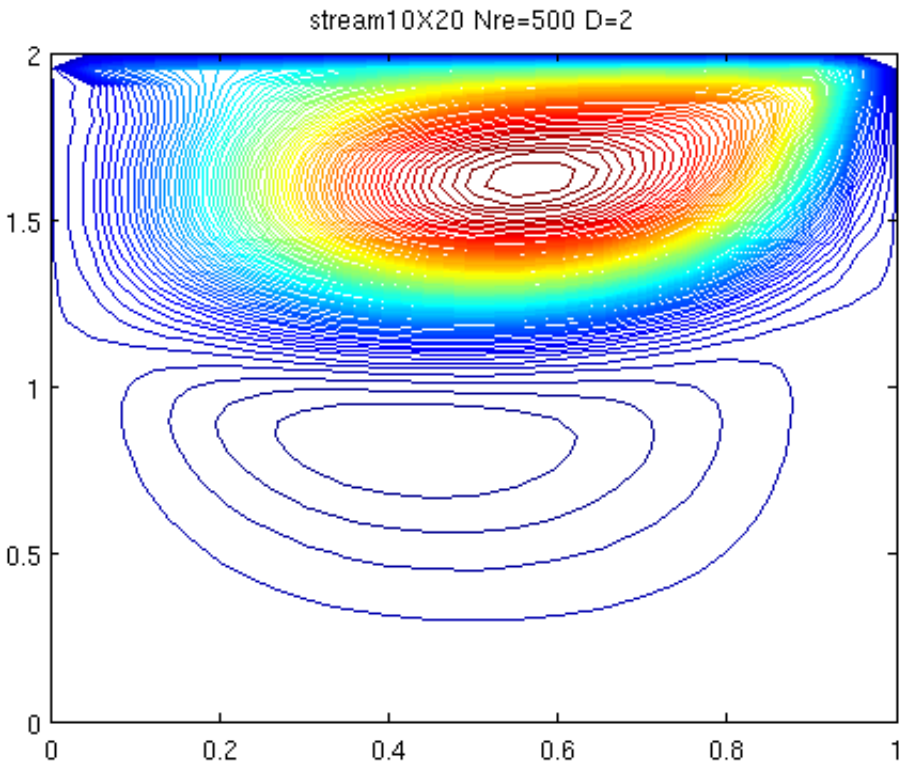


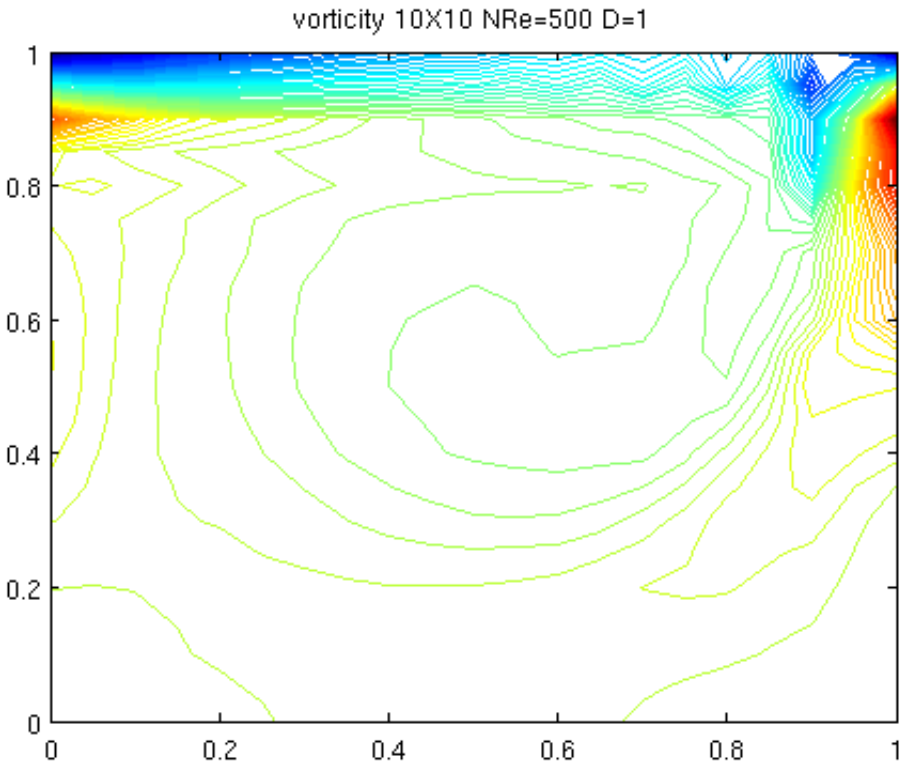

Pressure 10X20 NRe=500 D=2
20
18
16
14
12
10
8
6
4
2
1
2
3
4
5
6
7
8
9
10
11

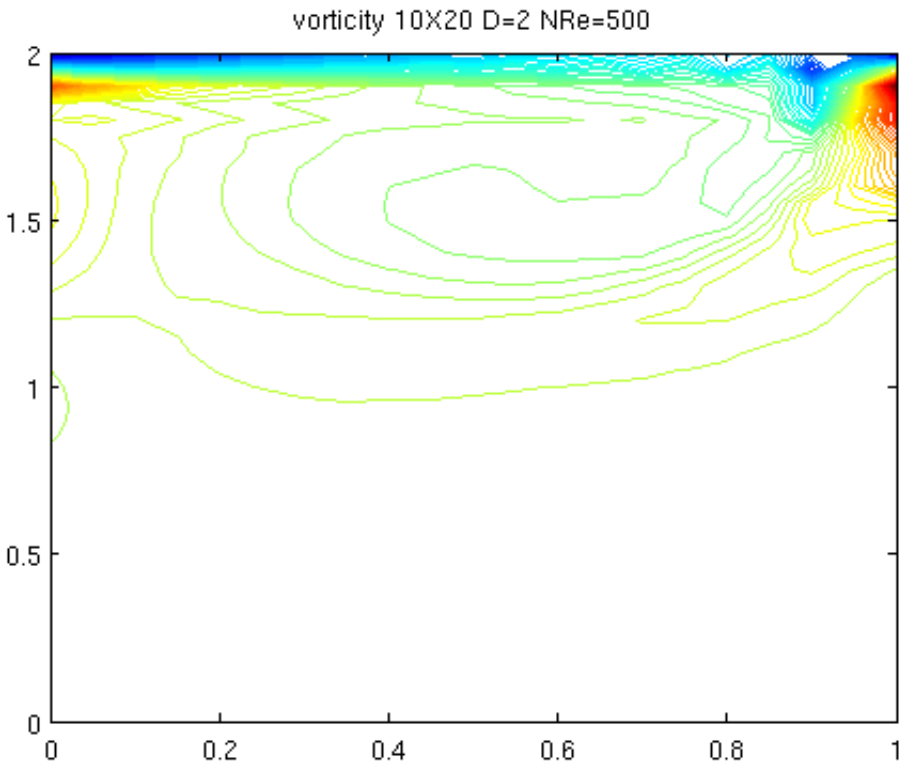

velocity vectors 10X10 NRe=500 D=1
1.2
1
0.8
0.6
0.4
0.2
0
-0.2
-0.2
0
0.2
0.4
0.6
0.8
1
1.2


Velocity vector 10X20 NRE=500 D=2
2.5
2
1.5
1
0.5
0
-0.5
-0.2
0
0.2
0.4
0.6
0.8
1
1.2


streamline10X10 NRe=500 D=1
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


stream10X20 Nre=500 D=2
2
1.5
1
0.5
0
0
0.2
0.4
0.6
0.8
1


vorticity 10X10 NRe=500 D=1
1
0.8
0.6
0.4
0.2
0
0
0.2
0.4
0.6
0.8
1


vorticity 10X20 D=2 NRe=500
2
1.5
1
0.5
0
0
0.2
0.4
0.6
0.8
1