ME543

Assignment 1

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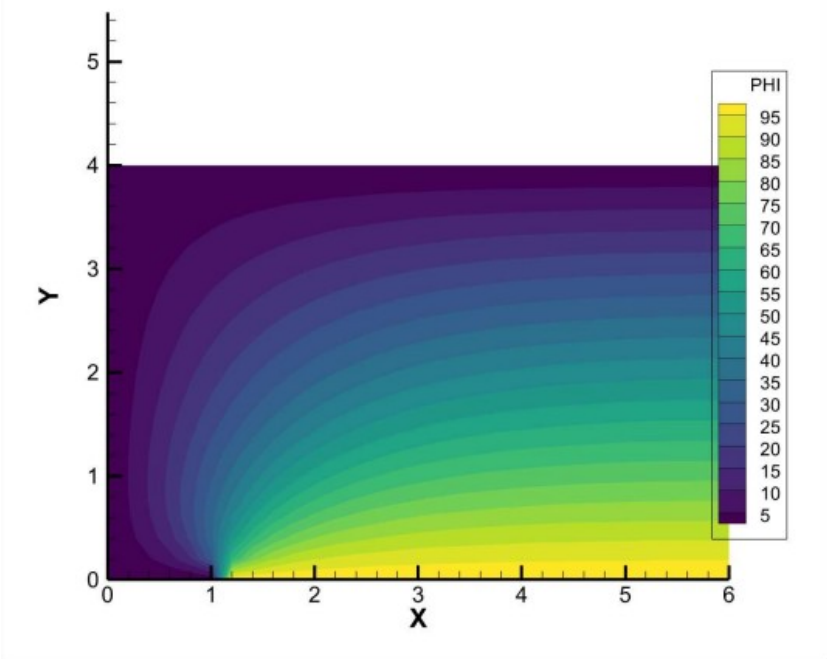
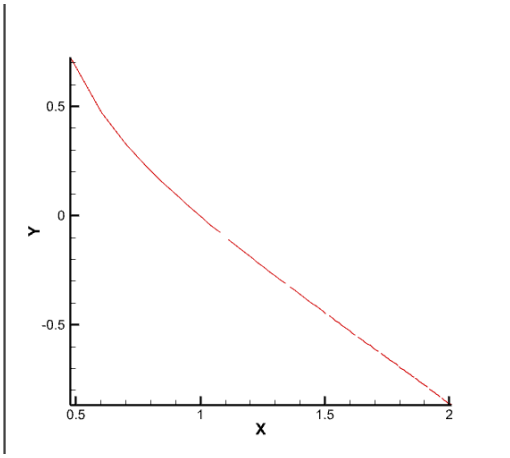
Problem 1:- grid size delx=dely=0.2

J is use for y-axis. From 1 to 21.

I is used for x-axis. From 1 to 31.

A. Jacobi iterative method





Log_iteration VS log_error plot

X-Axis= log(iteration)

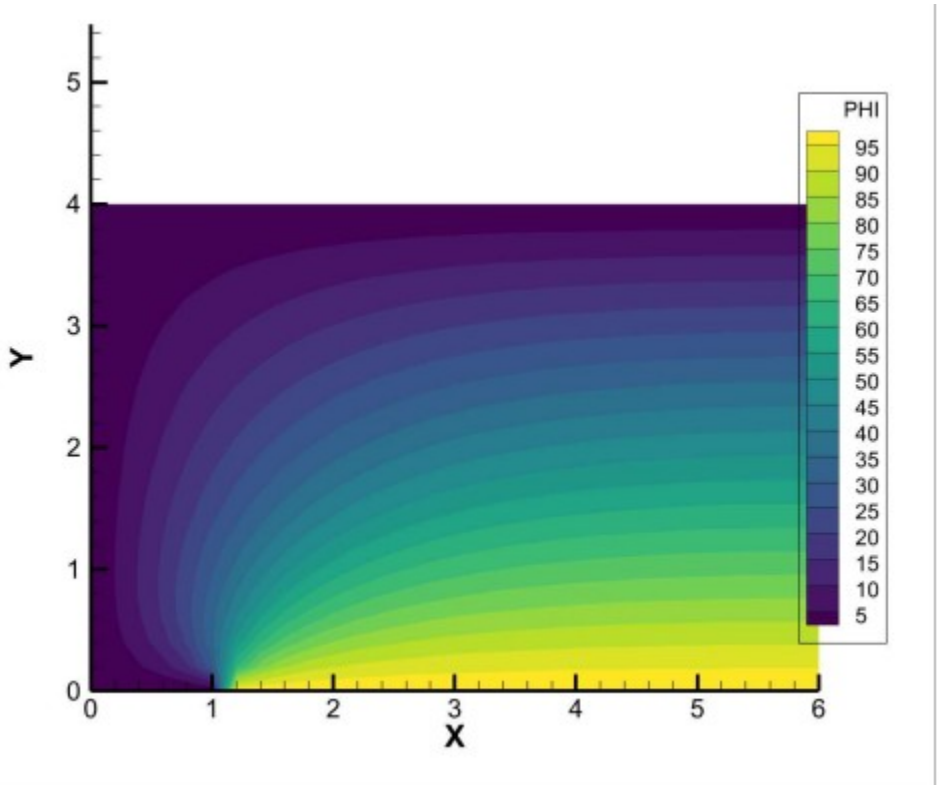
Y-Axis=log(error)

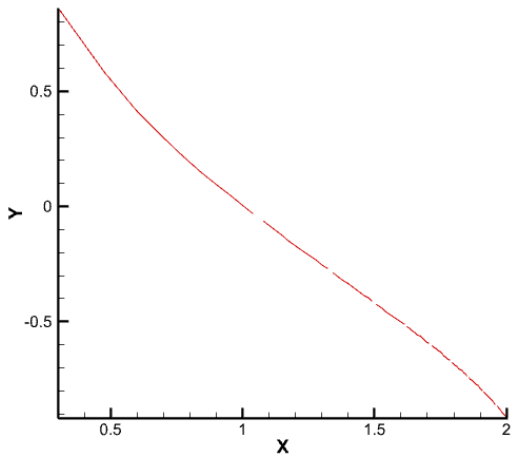
For error =1e-8

Number of iterations are **2487**

Txt file of iteration vs error is attached with the code.

B. Point Gauss-Seidel iterative method.





Log_iteration VS log_error plot

X-Axis= log(iteration)

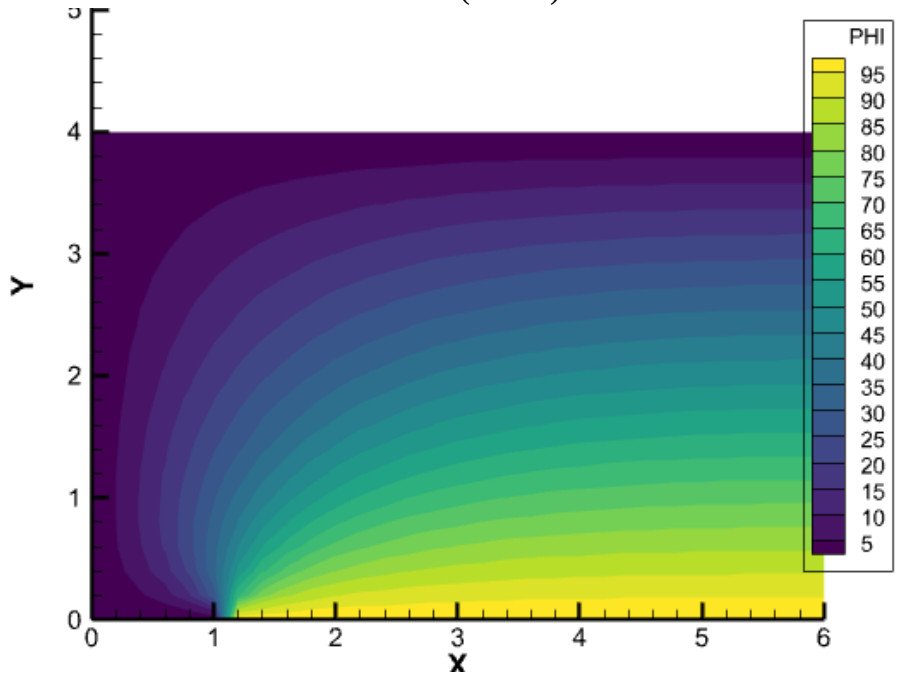
Y-Axis=log(error)

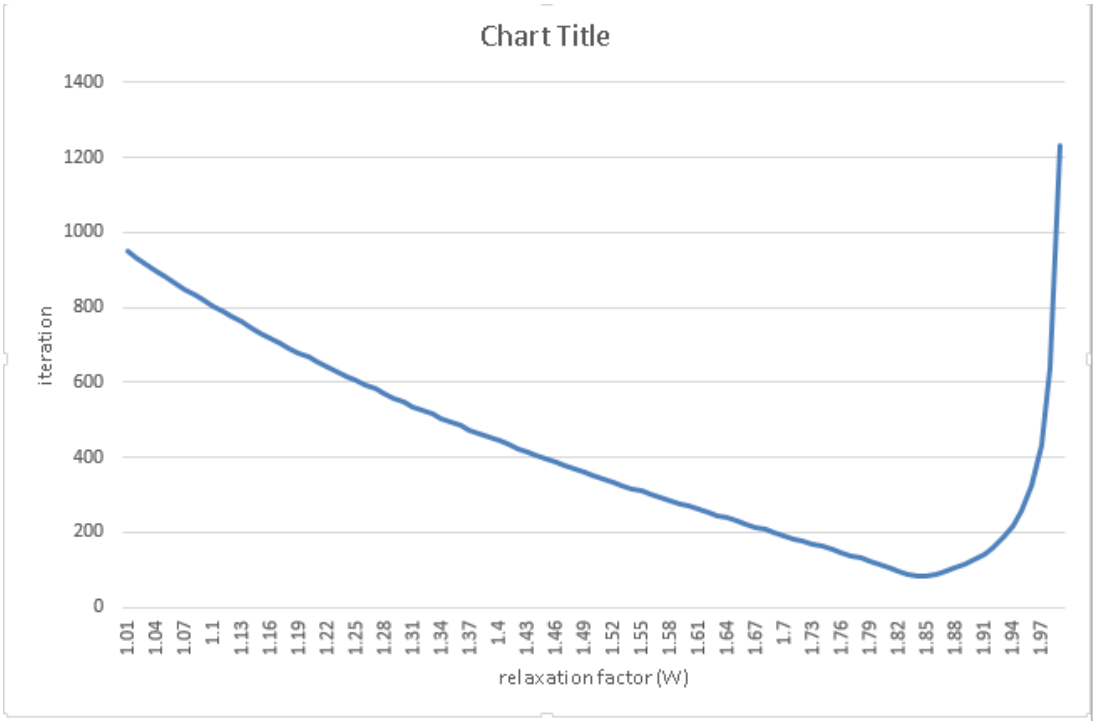
For error =1e-8

Number of iterations are **1308**

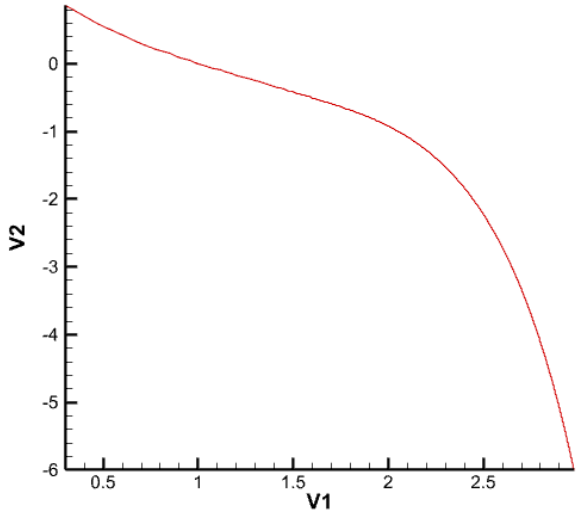
Txt file of iteration vs error is attached with the code.

C. 3. Point Successive Over Relaxation (PSOR) method





W optimum is **1.84**
No. of iteration for W=1.84 is **84**



Log_iteration VS log_error plot

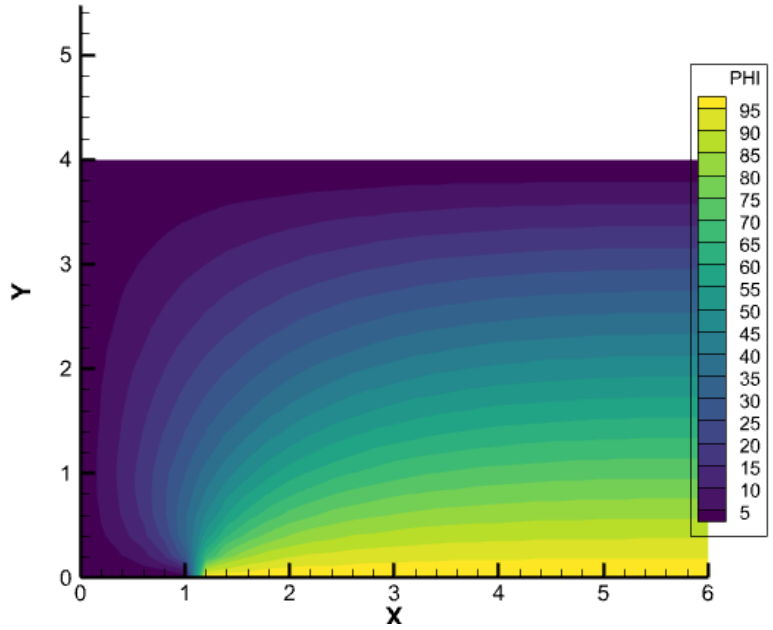
X-Axis= log(iteration)

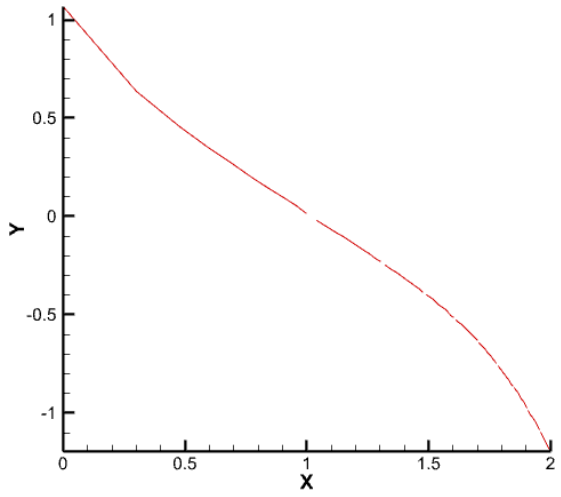
Y-Axis=log(error)

For error =1e-6

Txt file of iteration vs error is attached with the code.

D. 4. Line Gauss-Seidel iterative method (TriDiagonal Matrix Algorithm)





Log_iteration VS log_error plot

X-Axis= log(iteration)

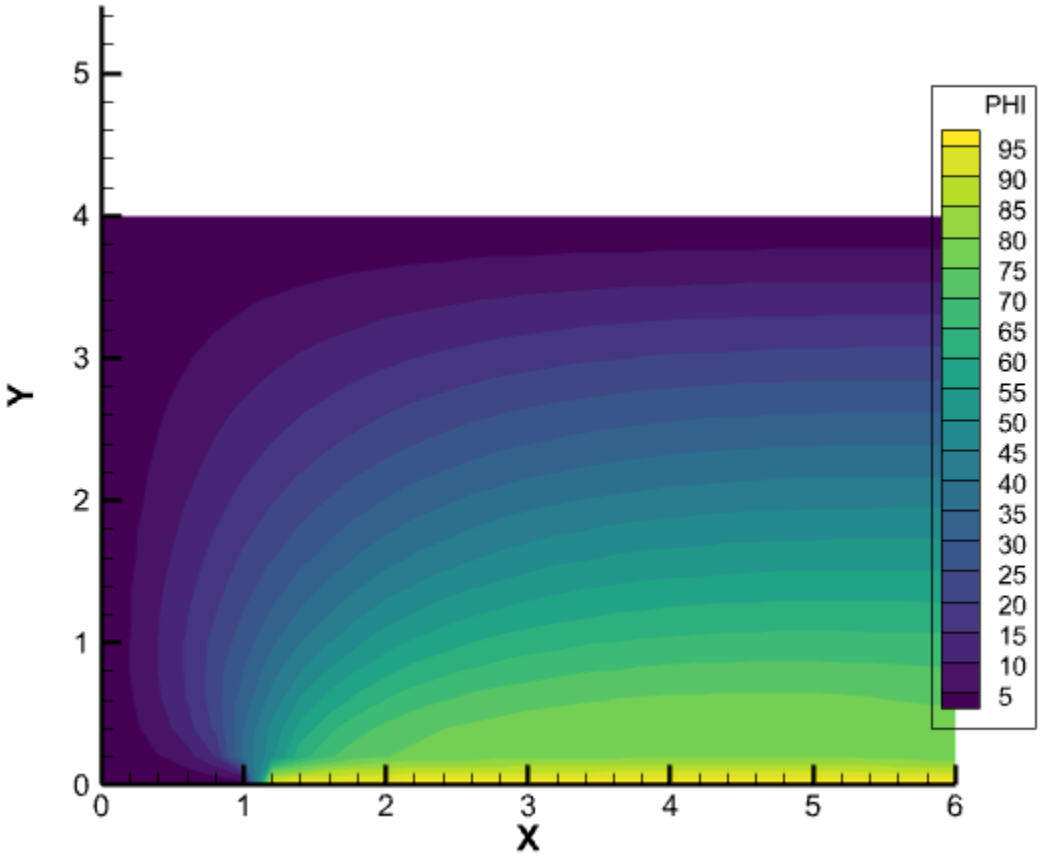
Y-Axis=log(error)

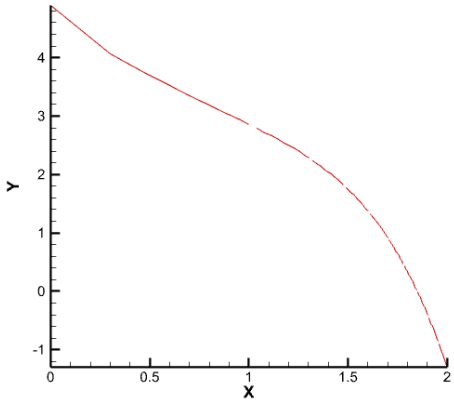
For error =1e-8

Number of iterations are **533**

Txt file of iteration vs error is attached with the code.

E. 5. Alternating Direction Implicit method (ADI)





Log_iteration VS log_error plot

X-Axis= log(iteration)

Y-Axis=log(error)

For error =1e-8

Number of iterations are **206**

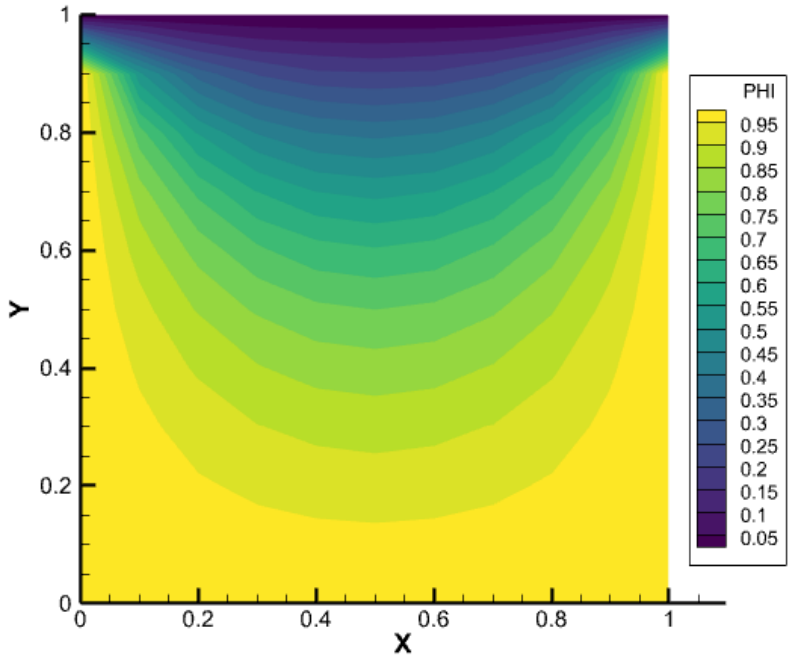
Txt file of iteration vs error is attached with the code.

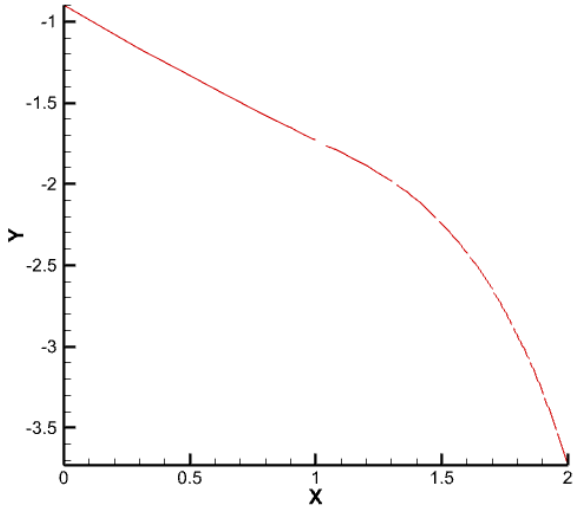
Problem 2:- grid size delx=dely=0.1

J is use for y-axis. From 1 to 11.

I is used for x-axis. From 1 to 11.

1. Jacobi iterative method





Log_iteration VS log_error plot

X-Axis= log(iteration)

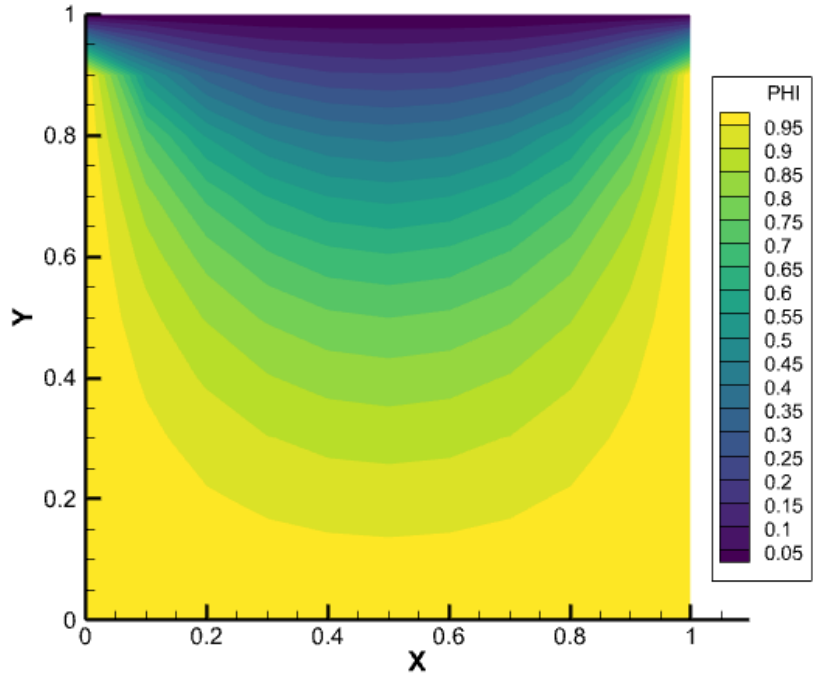
Y-Axis=log(error)

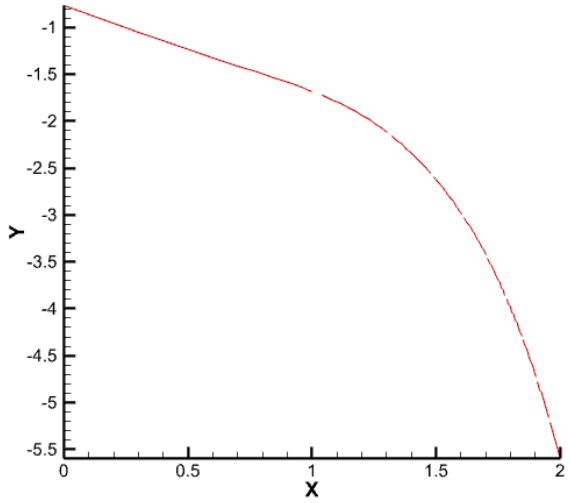
For error =1e-8

Number of iterations are **296**

Txt file of iteration vs error is attached with the code.

2. Point Gauss-Seidel iterative method





Log_iteration VS log_error plot

X-Axis= log(iteration)

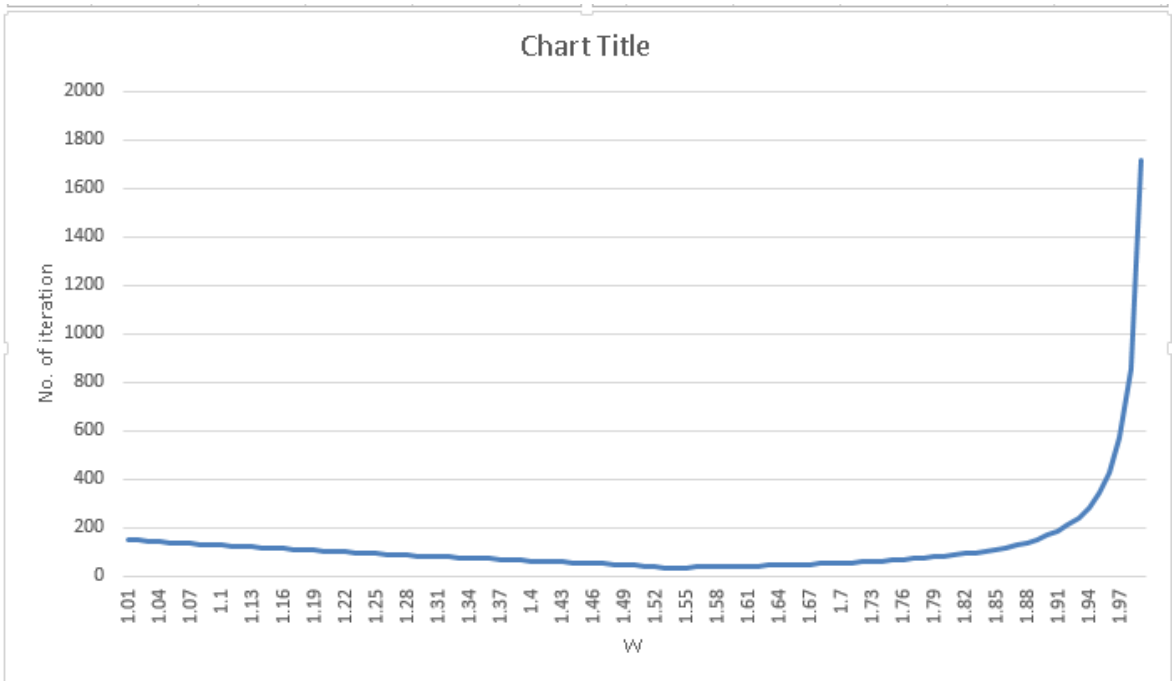
Y-Axis=log(error)

For error =1e-8

Number of iterations are **156**

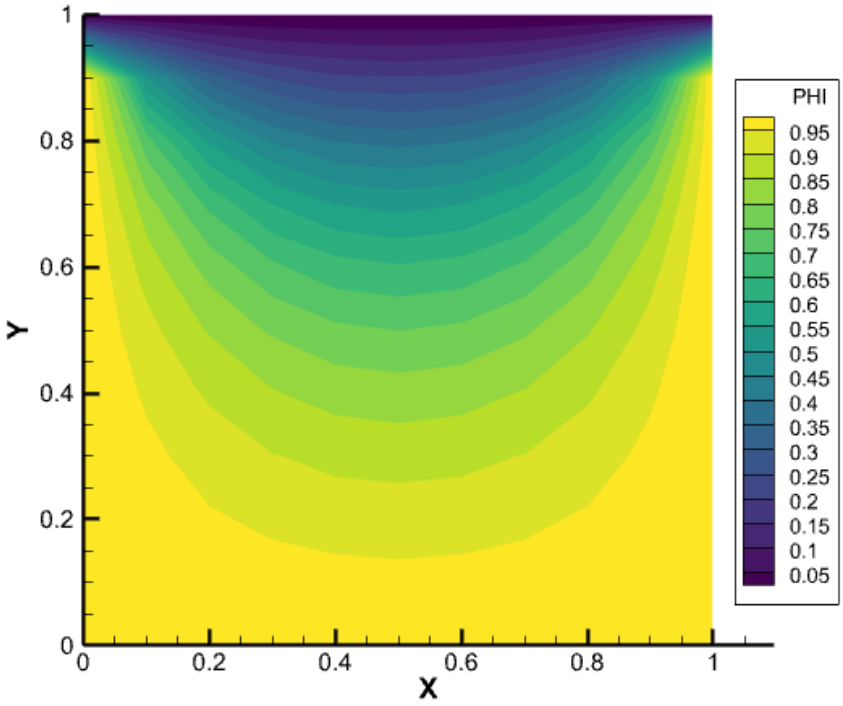
Txt file of iteration vs error is attached with the code.

3. Point Successive Over Relaxation (PSOR) method

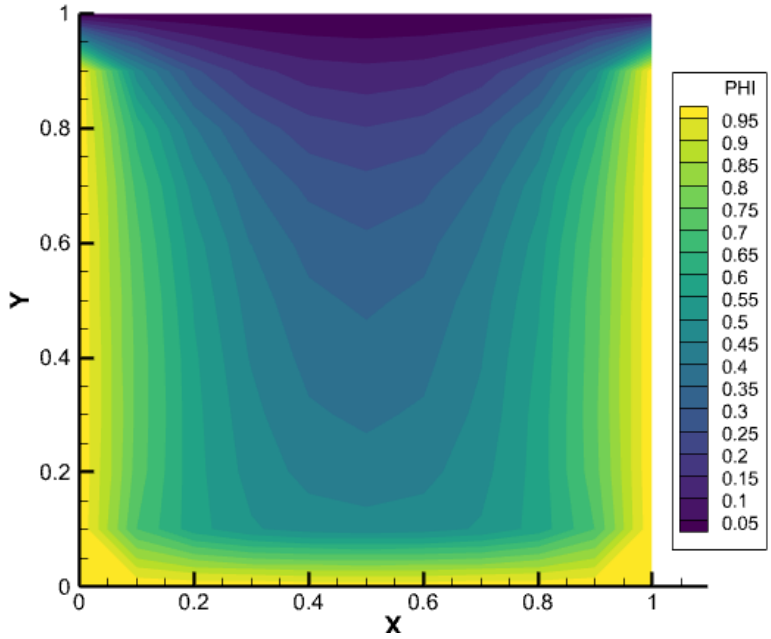


W optimum is **1.53**

no. of iteration **34**

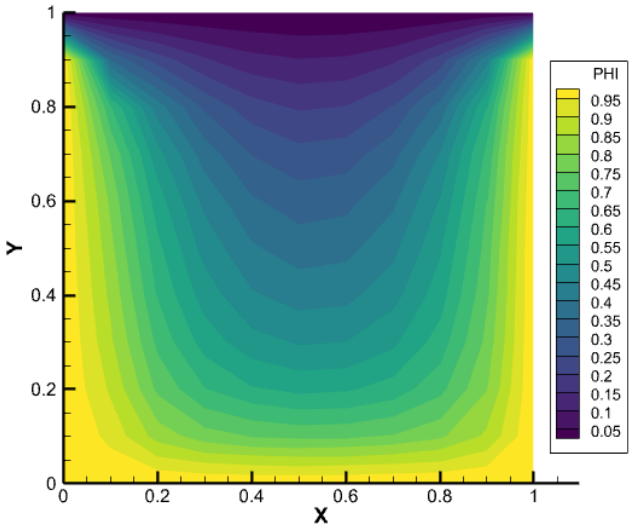


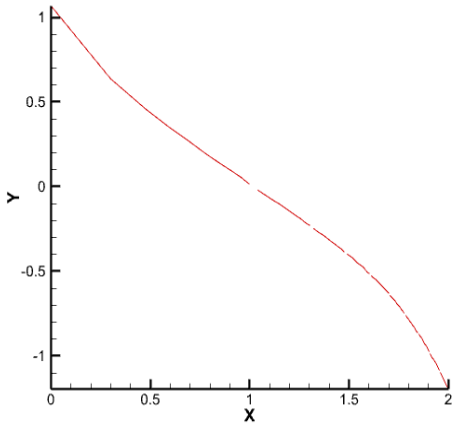
4. Line Gauss-Seidel iterative method (TriDiagonal Matrix Algorithm)



No. of iteration **56**

5. Alternating Direction Implicit method (ADI)





No. of iteration = **23**

Log_iteration VS log_error plot

X-Axis= log(iteration) Y-Axis=log(error) For error =1e-8