Question 1

1.1

Given

1.2

**A: Gaussian Elimination Without Pivoting.**

Forward Elimination:

:

:

:

:

:

Back Substitution:

**B: Gaussian Elimination With Scaled Partial Pivoting.**

Iteration 1:

Since the row in with the largest value is , no row interchange is required

:

Iteration 2:

:

Iteration 3:

No unique solution

**C: LU Deompisition**

Step 1:

Step 2:

Step 3:

Step 4:

1.3

Question 2

2.1

A

**B: Jacobi Method**

We have as the initial point, hence we can perform three iterations of the algorithm.

Iteration 1:

Iteration 2:

Iteration 3:

c

2.2

a

**B: Gauss-Siedel Method**

We have as the initial point, hence we can perform three iterations of the algorithm.

iteration 1:

iteration 2:

iteration 3:

C

2.3

**Successive Over-Relaxation Method**

We have as the initial point, with , hence we can perform three iterations of the algorithm.

iteration 1 :

iteration 2 :

iteration 3 :

2.4

Question 3

3.1

3.2

3.3

Question 4

x(1) = 1; y(1) = 1; z(1) = 1; dxyz = [1;1;1]; tol = 10^(-4);

while (sqrt(dxyz(1)^2+dxyz(2)^2+dxyz(3)^2)>tol)

jac = [2\*x(i),2\*y(i),2\*z(i);2\*x(i),0,3\*z(i)^2;2\*x(i),2\*y(i),-4];

b = [x(i)^2+y(i)^2+z(i)^2-1;x(i)^2+z(i)^3-0.25;x(i)^2+y(i)^2- 4\*x(i)];

dxyz = -inv(jac)\*b;

x(i+1) = x(i)+dxyz(1);

y(i+1) = y(i)+dxyz(2);

z(i+1) = z(i)+dxyz(3);

end