NUMERICAL ANALYSIS

ASSIGNMENT-5 GAUSS SEIDEL & SOR METHOD

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Q3.

CODE

```
A=[4.63 -1.21 3.22;-3.07 5.48 2.11;1.26 3.11 4.57];
B=[2.22;-3.17;5.11];
tol = 0.001;
n=3;
error = 1;
x = zeros(1,n);
xold = zeros(1,n);
while error > tol
 for i=1:n
 xold(i) = x(i);
 sum =0;
 for j=1:n
 if(i~=j)
 sum = sum + A(i,j)*x(j);
 end
 end
 x(i) = (B(i,:) - sum)/A(i,i);
 end
 error = abs(x(i)-xold(i));
end
disp(x);
```

OUTPUT

```
   -8.9807   -9.4762   10.0430

>>
```

Q4.

CODE

```
A=[4 1 -1 1;1 4 -1 -1;-1 -1 5 1;1 -1 1 3];
B=[-2;-1;0;1];
tol = 0.001;
w = 1.2;
n=4;
error = 1;
x = zeros(1,n);
xold = zeros(1,n);
while error > tol
 for i=1:n
 xold(i) = x(i);
 sum =0;
 for j=1:n
 if(i~=j)
 sum = sum + A(i,j)*x(j);
 end
 end
 x(i) = (1-w)*xold(i) + (w*(B(i,:) - sum))/A(i,i);
 end
 error = abs(x(i)-xold(i));
end
disp(x);
```

OUTPUT

```
   -0.7540    0.0404   -0.2808    0.6918

>>
```

Q.2 Algorithm for SOR

1. input matrix $A = [a_{ij}]$, B, x0, tolerance, omega & initial error
2. while (error > tolerance) perform steps from 3 to 6
3. for (i = 1, 2, ... x)
   x0 i = xi
   sum = 0
4. for (j = 1, 2, ... x)
   if (i != j)
   sum = sum + A(i,j) * xi ;
5. x1 = (1 - w) * xi + (w * (B(i,:) - sum)) A(i,j)
6. error = abs (xi - x(0i))
7. OUTPUT (x1, x2 ... xo)
   STOP