

# Gauss Jacobi

In[6] :=

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GaussJacobi[Ao_, bo_, Xo_, maxiter_] :=  
Module[{A = N[Ao], b = N[bo], xk = Xo, xk1, i, j, k = 0,  
  n, m, OutputDetails},  
  Size = Dimensions[A];  
  n = Size[[1];  
  m = Size[[2];  
  If[n ≠ m,  
    Print["This square matrix cannot proceed with Gauss Jacobi Method !!"];  
    Return[]];  
  OutputDetails = {xk};  
  xk1 = Table[0, {n}];  
  While[k < maxiter,  
    For[i = 1, i ≤ n, i++,  
      xk1[[i]] =  
        1 / A[[i, i]]  $\left( b[[i]] - \sum_{j=1}^{i-1} A[[i, j]] * xk[[j]] - \sum_{j=i+1}^n A[[i, j]] * xk[[j]] \right)$ ;];  
    k++;  
    OutputDetails = Append[OutputDetails, xk1];  
    xk = xk1];  
  colHeading = Table[X[k], {k, 1, n}];  
  Print[  
    NumberForm[TableForm[OutputDetails, TableHeadings → {None, colHeading}], 6]];  
  Print["Number of iterations Performed", maxiter];];  
  
A = {{5, 1, 2}, {-3, 9, 4}, {1, 2, -7}};  
b = {10, -14, -33};  
Xo = {0, 0, 0};  
GaussJacobi[A, b, Xo, 15];
```

X[1]	X[2]	X[3]
0	0	0
2.	-1.55556	4.71429
0.425397	-2.98413	4.55556
0.774603	-3.43845	3.92245
1.11871	-3.04067	3.84253
1.07112	-2.89044	4.00534
0.975953	-2.97867	4.04146
0.979148	-3.02644	4.00266
1.00422	-3.00813	3.98947
1.00584	-2.99391	3.99828
0.99947	-2.99729	4.00257
0.998428	-3.00132	4.0007
0.999985	-3.00083	3.9994
1.00041	-2.99974	3.99976
1.00004	-2.99976	4.00013
0.999898	-3.00004	4.00008

Number of iterations Performed15