

Program 4

OBJECTIVES: To solve the system of linear equations using gauss elimination method

Source Code:

(Gauss-Elimination-Iteration).

To solve the linear system $AX = B$ by starting with $P_0 = 0$ and generating a sequence $\{P_K\}$ that converges to the solution P (i.e., $AP = B$). A sufficient condition for the method to be applicable is that A is diagonally dominant.

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*/

#include<stdio.h>
#include<stdlib.h>
#include<math.h>

/* ----- */

/* Main program for algorithm 3.5 */

/* remember : in C the fields begin with element 0 */

#define N 4

void main(void)
{
    Float a[N][N+1], x[N], t, s;
    Int i, j, k;
    Printf("Enter the element of the augmented matrix row
wise\n");

    For(i=0; i<N; i++)
        For(j=0; j<N+1; j++)
            Scanf("%f", &a[i][j]);
    For(j=0; j<N-1; j++)
        For(i=j+1; i<N; i++)
        {
            t=a[i][j]/a[j][j];
            for(k=0; k<N+1; k++)
                a[i][k]=a[j][k]*t;
        }

    Printf("The upper triangular matrix is:\n");

    For(i=0; i<N; i++)
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For(j=0;j<N+1;j++)
    printf("%.4f%",a[i][j]);

    Printf("\n");

For(i=N-1;i>=0;i--)
{
    s=0;

    for(j=i+1;j<N;j++)

        s+=a[i][j]*x[j];

        x[i]=(a[i][N]-s)/a[i][i];
}

Printf("The solution is :\n");

For(i=0;i<N;i++)

    Printf("x[%3d]=%.4f\n", i+1,x[i]);
}
```