Metoda eliminarii de tip Gauss

Algoritm (Gauss):

Intrari: ai,j i,j =1,n, bi=1,n

Iesire: xi, i=1,n

Pasi:

1. Introducerea datelor : A,b
2. Pentru k=1,n-1 executa
   1. Daca ak,k !=0 atunci p = ak,k altfel Stop;
   2. Pentru j=k,n executa
      1. ak,j = ak,j/p;
   3. bk=bk/p
   4. Pentru i=k+1,n executa
      1. Pentru l=k+1,n executa
         1. ai,l= ai,l – ak,l \*ai,k
      2. bi = bi – bk\*ai,k
3. Aplicam procedura sistem superior triunghiular
4. Pentru k=1,n tipareste xk, Stop;

Algoritm(procedura sistem superior triunghiular)

1. Calc xn=bn/an,n
2. Pentru k=n-1,1 executa
   1. s=0
   2. Pentru i= k+1,n executa
      1. s=s+ak,i\*xi
   3. xk=(bk-s)/ak,k

Exemplu: n = 3

A = , b =

Rezultate: x1=2 x2=4, x3=3

using System;

namespace Gauss

{

class Program

{

static void Main(string[] args)

{

//double[] b = { -2, 9, 13 };

//double[,] A = { { 1,2,-4 } , {2,-1,3 },{-3,4,1 } };

double[] b = { 9, -1, -8 };

double[,] A = { { 10,2,-1 } , {-2,-5,1 },{-3,1,-5 } };

double[] rezultat = Gauss(3, A,b);

foreach (double item in rezultat)

{

Console.WriteLine(item);

}

Console.ReadKey();

}

static double[] Gauss(long n, double[,] A, double[] b)

{

double[] x = new double[n];

for(long k = 0; k < n - 1; k++)

{

double p;

if (A[k, k] != 0)

p = A[k, k];

else

return null;

for(long j = k; j < n; j++)

A[k, j] /= p;

b[k] /= p;

for (long i = k + 1; i < n; i++) {

for (long l = k+1; l < n; l++)

A[i, l] -= A[k, l] \* A[i, k];

b[i] -= b[k] \* A[i, k];

}

Console.WriteLine();

for (long q1 = 0; q1 < n; q1++)

{

for (long q2 = 0; q2 < n; q2++)

Console.Write(" " + A[q1, q2]);

Console.WriteLine();

}

}

Console.WriteLine();

for (long q1 = 0; q1 < n; q1++)

{

for (long q2 = 0; q2 < n; q2++)

Console.Write(" " + A[q1, q2]);

Console.WriteLine();

}

x[n-1] = b[n-1] / A[n-1, n-1];

for(long k = n - 1; k >= 0; k--)

{

double s = 0;

for(long i = k + 1; i < n; i++)

s += A[k, i] \* x[i];

x[k] = (b[k] - s) / A[k, k];

}

return x;

}

}

}