

# SISTEM PERSAMAAN LINIER – METODA GAUSS SEIDEL

Heru Dibyo Laksono, MT

Dengan menggunakan Matlab dan metoda eliminasi Gauss Seidel, tentukan penyelesaian dari sistem persamaan linier yang dinyatakan dalam bentuk persamaan (1) berikut

$$\begin{bmatrix} 70.0000 & 1.0000 & 0.0000 \\ 60.0000 & -1.0000 & 1.0000 \\ 40.0000 & 0.0000 & -1.0000 \end{bmatrix} \begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} 636.0000 \\ 518.0000 \\ 307.0000 \end{bmatrix} \quad (1)$$

Adapun kode Matlab untuk menyelesaikan soal diatas sebagai berikut

```
clc
clear all
close all
close all hidden
format compact
%
disp('Matrik A')
A = [70 1 0;60 -1 1;40 0 -1]
%
disp('Matrik b')
C = [636 ; 518 ; 307]
%
n = length(C);
X = zeros(n,1);
Error_eval = ones(n,1);
%
for i = 1:n
    j = 1:n;
    j(i) = [];
    B = abs(A(i,j));
    Check(i) = abs(A(i,i)) - sum(B);
    if Check(i) < 0
        end
    end
end
iteration = 0;
while max(Error_eval) > 0.001
    iteration = iteration + 1;
    Z = X;
    for i = 1:n
        j = 1:n;
        j(i) = [];
        Xtemp = X;
        Xtemp(i) = [];
        X(i) = (C(i) - sum(A(i,j) * Xtemp)) / A(i,i);
    end
    Xsolution(:,iteration) = X;
    Error_eval = sqrt((X - Z).^2);
end
disp(' ')
disp('Proses Iterasi')
K = [1:iteration;Xsolution]'
%
disp(' ')
disp(['Jumlah Iterasi      : ',num2str(iteration)])
disp(' ')
```

```

disp(['Tingkat Presisi      : '])
Error_eval
disp(' ')
disp('Nilai X')
X

```

## Hasil program

Matrik A

```

A =
    70     1     0
    60    -1     1
    40     0    -1

```

Matrik b

```

C =
    636
    518
    307

```

Proses Iterasi

```

K =
    1.0000    9.0857   27.1429   56.4286
    2.0000    8.6980   60.3061   40.9184
    3.0000    8.2242   16.3703   21.9679
    4.0000    8.8519   35.0791   47.0741
    5.0000    8.5846   44.1492   36.3834
    6.0000    8.4550   25.6841   31.2005
    7.0000    8.7188   36.3284   41.7520
    8.0000    8.5667   37.7562   35.6695
    9.0000    8.5463   30.4499   34.8536
   10.0000    8.6507   35.8966   39.0286
   11.0000    8.5729   35.4030   35.9163
   12.0000    8.5800   32.7137   36.1983
   13.0000    8.6184   35.3008   37.7350
   14.0000    8.5814   34.6200   36.2567
   15.0000    8.5911   33.7252   36.6457
   16.0000    8.6039   34.8812   37.1570
   17.0000    8.5874   34.4017   36.4964
   18.0000    8.5943   34.1521   36.7705
   19.0000    8.5978   34.6401   36.9131
   20.0000    8.5909   34.3644   36.6342
   21.0000    8.5948   34.3219   36.7917
   22.0000    8.5954   34.5159   36.8161
   23.0000    8.5926   34.3739   36.7052
   24.0000    8.5947   34.3847   36.7863
   25.0000    8.5945   34.4566   36.7802
   26.0000    8.5935   34.3888   36.7391
   27.0000    8.5944   34.4058   36.7778
   28.0000    8.5942   34.4300   36.7681
   29.0000    8.5939   34.3996   36.7543
   30.0000    8.5943   34.4118   36.7717
   31.0000    8.5941   34.4187   36.7647
   32.0000    8.5940   34.4058   36.7608
   33.0000    8.5942   34.4129   36.7681
   34.0000    8.5941   34.4142   36.7640
   35.0000    8.5941   34.4090   36.7633
   36.0000    8.5942   34.4127   36.7663
   37.0000    8.5941   34.4125   36.7642
   38.0000    8.5941   34.4106   36.7643
   39.0000    8.5941   34.4124   36.7654
   40.0000    8.5941   34.4119   36.7644
   41.0000    8.5941   34.4113   36.7646

```

Jumlah Iterasi : 41

Tingkat Presisi :

Error\_eval =

1.0e-03 \*

0.0061

0.6497

0.2427

Nilai X

X =

8.5941

34.4113

36.7646