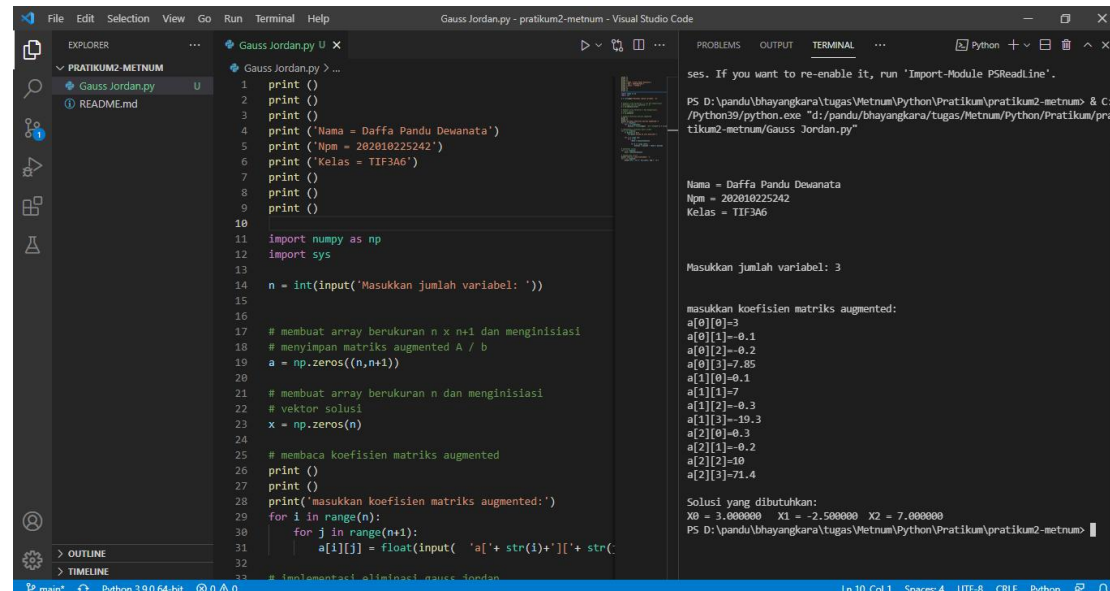


Tugas Python Pratikum 2

Script Dan Hasil Gauss Jordan


```

1 print ()
2 print ()
3 print ()
4 print ('Nama = Daffa Pandu Dewanata')
5 print ('Npm = 202010225242')
6 print ('Kelas = TIF3A6')
7 print ()
8 print ()
9 print ()
10
11 import numpy as np
12 import sys
13
14 n = int(input('Masukkan jumlah variabel: '))
15
16
17 # membuat array berukuran n x n+1 dan menginisiasi
18 # menyimpan matriks augmented A / b
19 a = np.zeros((n,n+1))
20
21 # membuat array berukuran n dan menginisiasi
22 # vektor solusi
23 x = np.zeros(n)
24
25 # membaca koefisien matriks augmented
26 print ()
27 print ()
28 print('masukkan koefisien matriks augmented:')
29 for i in range(n):
30     for j in range(n+1):
31         a[i][j] = float(input( 'a['+ str(i)+'']['+ str(j)+'']='))
32
33 # implementasi eliminasi gauss-jordan

```

ses. If you want to re-enable it, run 'Import-Module PSReadLine'.

```

PS D:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\pratikum2-metnum> & C:\Python39\python.exe "d:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\pratikum2-metnum\Gauss Jordan.py"

```

Nama = Daffa Pandu Dewanata
Npm = 202010225242
Kelas = TIF3A6

Masukkan jumlah variabel: 3

masukkan koefisien matriks augmented:

```

a[0][0]=-3
a[0][1]=-0.1
a[0][2]=-0.2
a[0][3]=7.85
a[1][0]=-0.1
a[1][1]=7
a[1][2]=-0.3
a[1][3]=-19.3
a[2][0]=-0.3
a[2][1]=-0.2
a[2][2]=10
a[2][3]=-71.4

```

Solusi yang dibutuhkan:
X0 = 3.000000 X1 = -2.500000 X2 = 7.000000
PS D:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\pratikum2-metnum>

```

print ()
print ()
print ()
print ('Nama = Daffa Pandu Dewanata')
print ('Npm = 202010225242')
print ('Kelas = TIF3A6')
print ()
print ()
print ()

```

```

import numpy as np
import sys

```

```

n = int(input('Masukkan jumlah variabel: '))

```

```

# membuat array berukuran n x n+1 dan menginisiasi
# menyimpan matriks augmented A / b
a = np.zeros((n,n+1))

```

```

# membuat array berukuran n dan menginisiasi
# vektor solusi
x = np.zeros(n)

```

```

# membaca koefisien matriks augmented
print ()
print ()
print('masukkan koefisien matriks augmented:')
for i in range(n):
    for j in range(n+1):
        a[i][j] = float(input( 'a['+ str(i)+'']['+ str(j)+'']='))

```



```

import scipy
from scipy.linalg import lu, lu_factor, lu_solve
import numpy as np

# Definisikan matriks A
A = np.array([[3., -0.1, -0.2], [0.1, 7., -0.3], [0.3, -0.2, 10]])

# Definisikan vektor b
b = np.array([7.85, -19.3, 71.4])

# Solusi yang diberikan Lu dan b
P, L, U = lu(A)
lu, piv = lu_factor(A)
x = lu_solve((lu, piv), b)
print('Matriks P :\n', P)
print('Matriks L :\n', L)
print('Matriks U :\n', U)
print('Solutions :\n', x)

```

Script Dan Hasil Gauss Seidel

The screenshot shows a Visual Studio Code editor with a file named 'Faktorisasi LU.py'. The script implements LU decomposition using SciPy. The output in the terminal shows the matrices P, L, and U, and the solution vector x.

```

1  'int ()
2  'int ()
3  'int ()
4  'int ('Nama = Daffa Pandu Dewanata')
5  'int ('Npm = 202010225242')
6  'int ('Kelas = TIF3A6')
7  'int ()
8  'int ()
9  'int ()
10
11 import scipy
12 from scipy.linalg import lu, lu_factor, lu_solve
13 import numpy as np
14
15 Definisikan matriks A
16 = np.array([[3., -0.1, -0.2], [0.1, 7., -0.3], [0.3, -0.2, 10]])
17
18 Definisikan vektor b
19 = np.array([7.85, -19.3, 71.4])
20
21 Solusi yang diberikan Lu dan b
22 L, U = lu(A)
23 l, piv = lu_factor(A)
24 = lu_solve((l, piv), b)
25 'int ('Matriks P :\n', P)
26 'int ('Matriks L :\n', L)
27 'int ('Matriks U :\n', U)
28 'int ('Solutions :\n', x)

```

Terminal Output:

```

Try the new cross-platform PowerShell https://aka.ms/pscore6
Warning: PowerShell detected that you might be using a screen reader and has disabled PSReadLine for compatibility purposes. If you want to re-enable it, run 'Import-Module PSReadLine'.

PS D:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\pratikum2-metnum> & C:/Python39/python.exe "d:/pandu/bhayangkara/tugas/Metnum/Python/Pratikum/pratikum2-metnum/Faktorisasi LU.py"

Nama = Daffa Pandu Dewanata
Npm = 202010225242
Kelas = TIF3A6

Matriks P :
[[1. 0. 0.]
 [0. 1. 0.]
 [0. 0. 1.]]
Matriks L :
[[1. 0. 0.]
 [0.03333333 1. 0.]
 [0.1 -0.02712994 1.]]
Matriks U :
[[3. -0.1 -0.2]
 [0. 7.00333333 -0.29333333]
 [0. 0. 10.01204188]]
Solutions :
[ 3. -2.5 7.]
PS D:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\pratikum2-metnum>

```

```

print ()
print ()
print ()
print ('Nama = Daffa Pandu Dewanata')
print ('Npm = 202010225242')
print ('Kelas = TIF3A6')
print ()
print ()
print ()

```

```
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n' % (x1,y1,z1))
```

Latihan Pratikum 2

Selesaikan :

$$4x_1 + 3x_2 - x_3 = -4$$

$$-2x_1 - 4x_2 + 5x_3 = 40$$

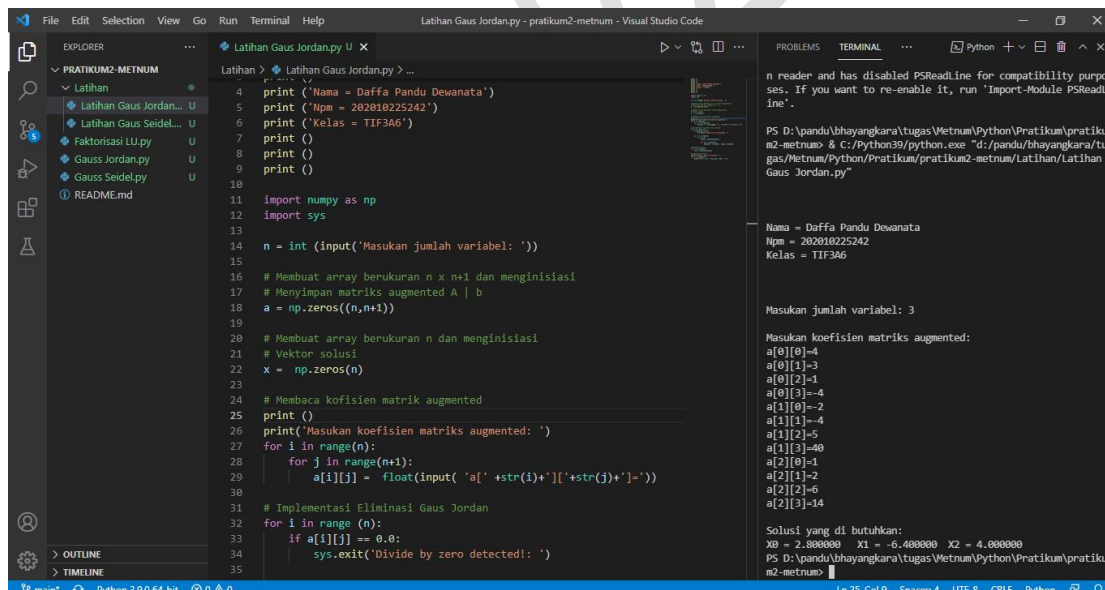
$$x_1 + 2x_2 + 6x_3 = 14$$

Sistem persamaan linear di atas dengan Metode :

1. Eliminasi Gauss Jordan
2. Iterasi Gauss-Sidel dengan nilai awal (2,-8,2), dan solusi sejatinya berdasarkan perhitungan (a).
3. Berdasarkan jawaban 1 dan 2, apa yang dapat kalian simpulkan?

Jawaban

Eliminasi Gauss Jordan



```
File Edit Selection View Go Run Terminal Help
Lathan Gaus Jordan.py - praktikum2-metnum - Visual Studio Code

EXPLORER
PRATIKUM2-METNUM
  Latihan
    Latihan Gaus Jordan.py
    Latihan Gaus Seidel.py
    Faktorisasi LU.py
    Gauss Jordan.py
    Gauss Seidel.py
    README.md

Lathan > Latihan Gaus Jordan.py
4 print ('Nama = Daffa Pandu Dewanata')
5 print ('Npm = 202010225242')
6 print ('Kelas = TIF3A6')
7 print ()
8 print ()
9 print ()
10
11 import numpy as np
12 import sys
13
14 n = int (input('Masukan jumlah variabel: '))
15
16 # Membuat array berukuran n x n+1 dan menginisiasi
17 # Menyimpan matriks augmented A | b
18 a = np.zeros((n,n+1))
19
20 # Membuat array berukuran n dan menginisiasi
21 # Vektor solusi
22 x = np.zeros(n)
23
24 # Membaca koefisien matriks augmented
25 print ()
26 print('Masukan koefisien matriks augmented: ')
27 for i in range(n):
28     for j in range(n+1):
29         a[i][j] = float(input('a['+str(i)+'']['+str(j)+'']='))
30
31 # Implementasi Eliminasi Gauss Jordan
32 for i in range (n):
33     if a[i][i] == 0.0:
34         sys.exit('Divide by zero detected: ')
35
PROBLEMS
TERMINAL
Python
n reader and has disabled PSReadLine for compatibility purpo
ses. If you want to re-enable it, run 'Import-Module PSReadl
ine'.
PS D:\pandubhayangkara\tugas\metnum\python\Pratikum\pratiku
m2-metnum> & c:/python39/python.exe "d:/pandubhayangkara/tu
gas/Metnum/python/Pratikum/pratikum2-metnum/Latihan/Latihan
Gaus Jordan.py"

Nama = Daffa Pandu Dewanata
Npm = 202010225242
Kelas = TIF3A6

Masukan jumlah variabel: 3

Masukan koefisien matriks augmented:
a[0][0]=4
a[0][1]=-3
a[0][2]=-1
a[0][3]=-4
a[1][0]=-2
a[1][1]=-4
a[1][2]=-5
a[1][3]=40
a[2][0]=1
a[2][1]=-2
a[2][2]=6
a[2][3]=14

Solusi yang di butuhkan:
X0 = 2.888888 X1 = -6.400000 X2 = 4.000000
PS D:\pandubhayangkara\tugas\metnum\python\Pratikum\pratiku
m2-metnum>
```

```
print ()
print ()
print ()
print ('Nama = Daffa Pandu Dewanata')
print ('Npm = 202010225242')
print ('Kelas = TIF3A6')
print ()
print ()
print ()
```

```
import numpy as np
import sys

n = int (input('Masukan jumlah variabel: '))

# Membuat array berukuran n x n+1 dan menginisiasi
# Menyimpan matriks augmented A | b
a = np.zeros((n,n+1))

# Membuat array berukuran n dan menginisiasi
# Vektor solusi
x = np.zeros(n)

# Membaca koefisien matrik augmented
print ()
print('Masukan koefisien matriks augmented: ')
for i in range(n):
    for j in range(n+1):
        a[i][j] = float(input( 'a[' +str(i)+'']['+str(j)+'']='))

# Implementasi Eliminasi Gaus Jordan
for i in range (n):
    if a[i][i] == 0.0:
        sys.exit('Divide by zero detected!: ')

    for j in range(n):
        if i != j:
            ratio = a[j][i]/a[i][i]

            for k in range(n+1):
                a[j][k] = a [j][k] - ratio * a[i][k]

# Penentuan Solusi
for i in range(n):
    x[i] = a[i][n]/a[i][i]

# Menampilkan Solusi
print('\nSolusi yang di butuhkan: ')
for i in range(n):
    print('X%d = %0.6f' %(i,x[i]), end = '\t')
```

Iterasi Gauss-Sidel

```

1 print ()
2 print ()
3 print ()
4 print ('Nama = Daffa Pandu Dewanata')
5 print ('Npm = 202010225242')
6 print ('Kelas = TIF3A6')
7 print ()
8 print ()
9 print ()
10
11 # Iterasi Gauss Seidel
12
13 # Definisikan Persamaan yang akan diselesaikan
14 # Dalam bentuk dominan secara diagonal
15 # Iterasi Gauss Seidel
16
17 # Definisikan Persamaan yang akan diselesaikan
18 # Dalam bentuk dominan secara diagonal
19 f1 = lambda x,y,z: (-4+3*y+0z)/4
20 f2 = lambda x,y,z: (40-2*x+5z)/-4
21 f3 = lambda x,y,z: (14+0*x+2y)/6
22
23 # Inisial awal
24 x0 = 2
25 y0 = -8
26 z0 = 2
27 step = 1
28
29 # Input nilai galat/error
30 e = float(input('Input Toleransi error: '))
31
32 # Implementasi iterasi Gauss Seidel
33 print ('\\nSelesai')

```

Output:

```

n reader and has disabled PSReadLine for compatibility purpo
ses. If you want to re-enable it, run 'Import-Module PSRead
line'.

PS D:\pandu\bhayangkara\tugas\Metnum\Python\Pratikum\prakti
m2-metnum> & C:\Python39\python.exe -d:"pandu\bhayangkara\tu
gas\Metnum\Python\Pratikum\pratikum2-metnum\Latihan\Latihan
Gaus Seidel.py"

Nama = Daffa Pandu Dewanata
Npm = 202010225242
Kelas = TIF3A6

Input Toleransi error: 0.00001

Step    x        y        z
1      -7.0000  -16.0000  -3.0000
2      -13.8000  -12.7500  -1.9167
3      -10.5625  -12.8854  -1.9618
4      -10.6641  -12.8798  -1.9599
5      -10.6598  -12.8800  -1.9600
6      -10.6600  -12.8800  -1.9600

Solusi: x=-10.660, y=-12.880 and z = -1.960

Input Toleransi error:

```

```
print ()
print ()
print ()
print ('Nama = Daffa Pandu Dewanata')
print ('Npm = 202010225242')
print ('Kelas = TIF3A6')
```

Iterasi Gauss Seidel

```
# Definisikan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
# Iterasi Gauss Seidel
```

```
# Definiskan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
f1 = lambda x,y,z: (-4+3*y-0*z)/4
f2 = lambda x,y,z: (40-2*x+5*z)/-4
f3 = lambda x,y,z: (14+0*x+2*y)/6
```

```
# Inisial awal
x0 = 2
y0 = -8
z0 = 2
step = 1
```

```
e2 = abs(y0-y1);
```



```
e3 = abs(z0-z1);

step +=1
x0 = x1
y0 = y1
z0 = z1

condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n' % (x1,y1,z1))

# Inisial awal
x0 = 1
y0 = 2
z0 = 2
step = 1

# Input nilai galat/error
e = float(input('Input Toleransi error: '))

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\t y\tz\n')

condition = True

while condition:
    x1 = f1(x0,y0,z0)
    y1 = f2(x1,y0,z0)
    z1 = f3(x1,y1,z0)
    print('%d\t%0.4f\t%0.4f\t%0.4f\n' % (step, x1,y1,z1))
    e1 = abs(x0-x1);
    e2 = abs(y0-y1);
    e3 = abs(z0-z1);

    step +=1
    x0 = x1
    y0 = y1
    z0 = z1

    condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n' % (x1,y1,z1))

# Inisial awal
x0 = 1
y0 = 2
z0 = 2
step = 1
```

```
condition = e1>e and e2>e and e3>e
print('\nSolusi: x=%0.3f, y=%0.3f and z = %0.3f\n' % (x1,y1,z1))
```