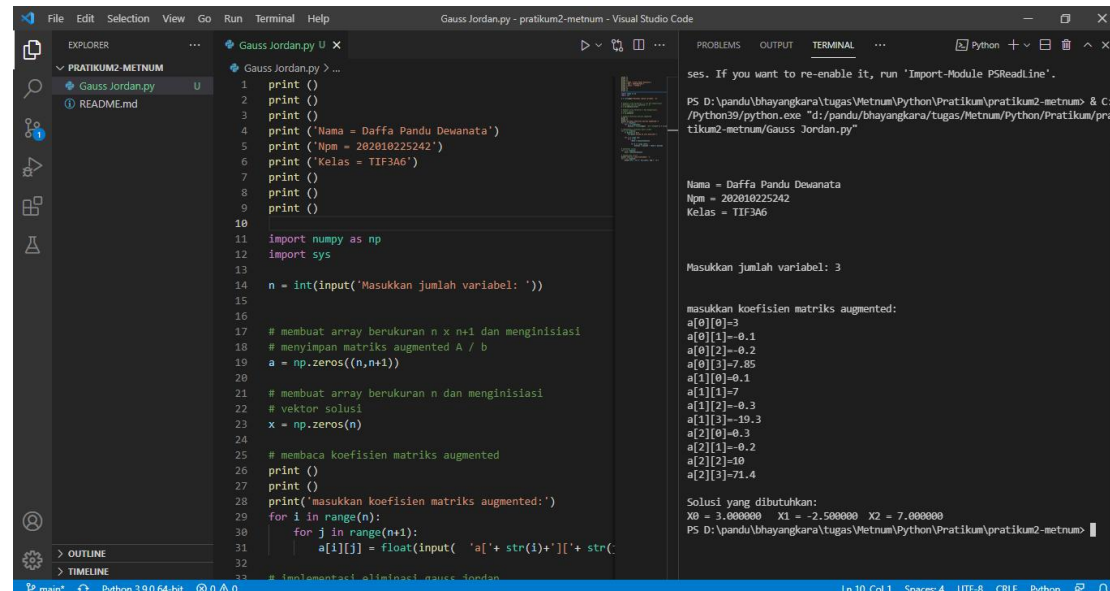Tugas Python Pratikum 2

Scripct Dan Hasil Gauss Jordan


```python
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)+']='))
```

```
# implementasi eliminasi gauss 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 dibutuhkan: ')
for i in range(n):
  print('X%d = %0.6f' %(i,x[i]), end = '\t')
```

Scripct Dan Hasil Faktorisasi LU


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

```
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)
```

Scripct Dan Hasil Gauss Seidel


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

Iterasi Gauss Seidel

```python
# Definisikan Persamaan yang akan diselesaikan
# Dalam bentuk dominan secara diagonal
f1 = lambda x,y,z: (7.85+0.1*y+0.2*z)/3
f2 = lambda x,y,z: (-19.3-0.1*x+0.3*z)/7
f3 = lambda x,y,z: (71.4-0.3*x+0.2*y)/10

# 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\ty\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))
```

Latihan Pratikum 2

Selesaikan :

$$4x_1 + 3x_2 - x_3 = -4$$
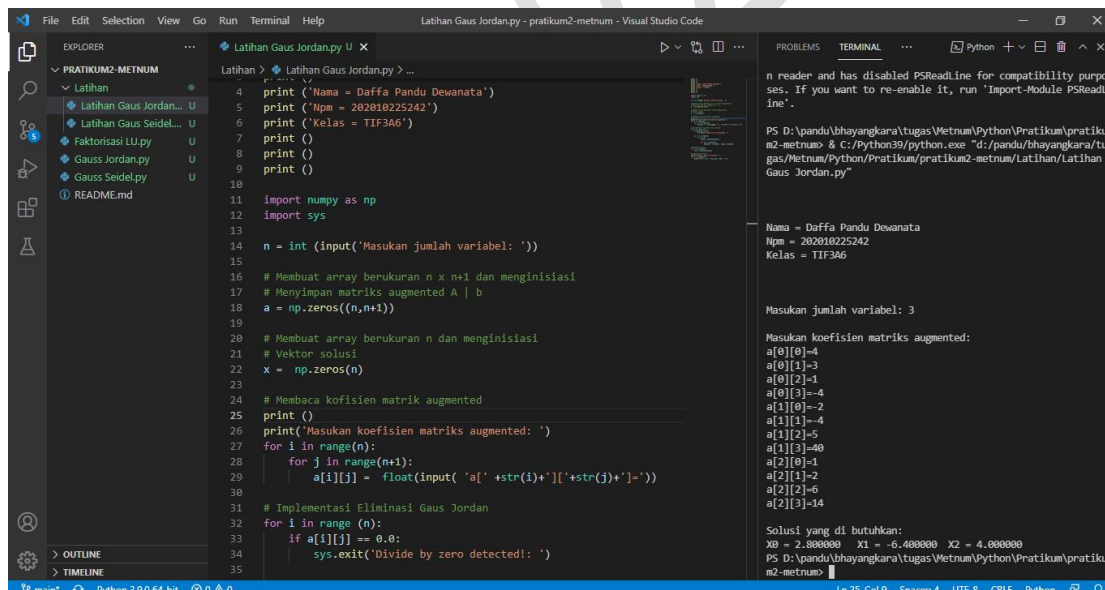$$-2x_1 - 4x_2 + 5x_3 = 40$$
$$x_1 + 2x_2 + 6x_3 = 14$$

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


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

```python
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 kofisien 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][j] == 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


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

# Iterasi Gauss Seidel

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

# Definisikan 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
```

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

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\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

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

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\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);
```

```python
    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\ty\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
```

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

# Implementasi iterasi Gauss Seidel
print('\nStep\tx\ty\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))
```