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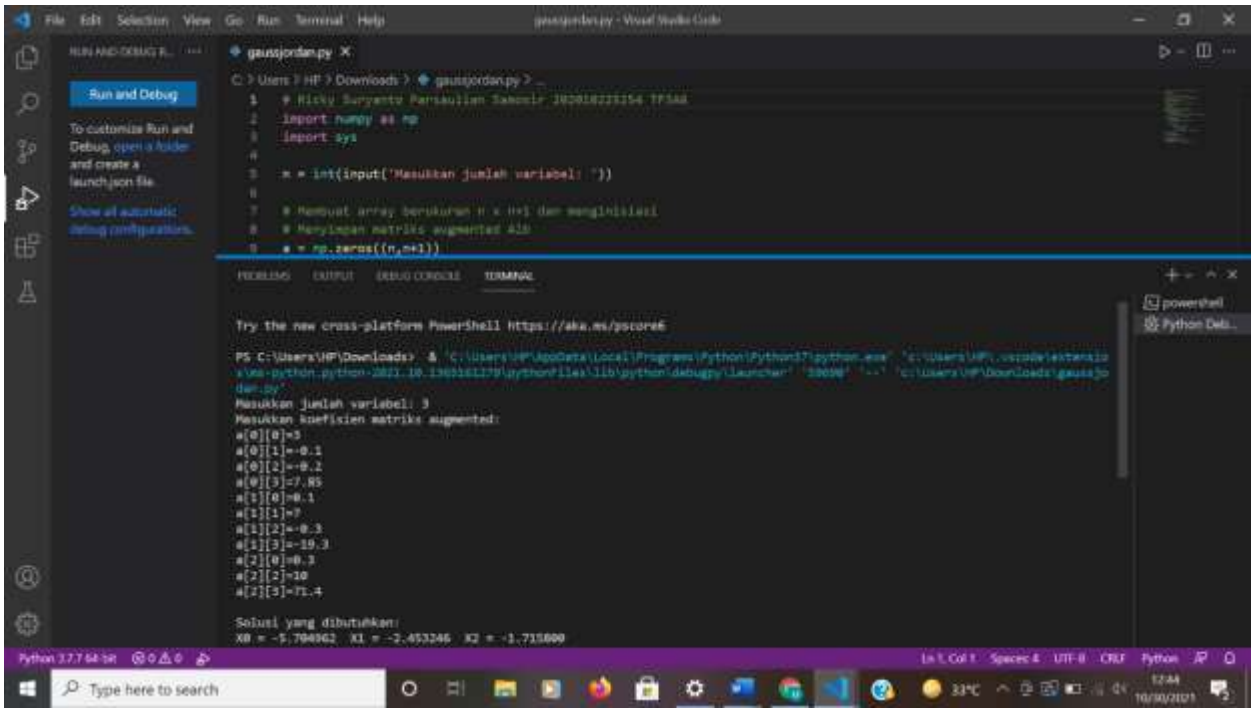
NPM : 202010225254
Kelas : TF3A6

PRAKTIKUM METODE NUMERIK MODUL 2

1.1 METODE GAUSS JORDAN



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Codingnya:

```
# Ricky Suryanto Parsaulian Samosir 202010225254 TF3A6
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('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 Elimanasi 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[1][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')
```

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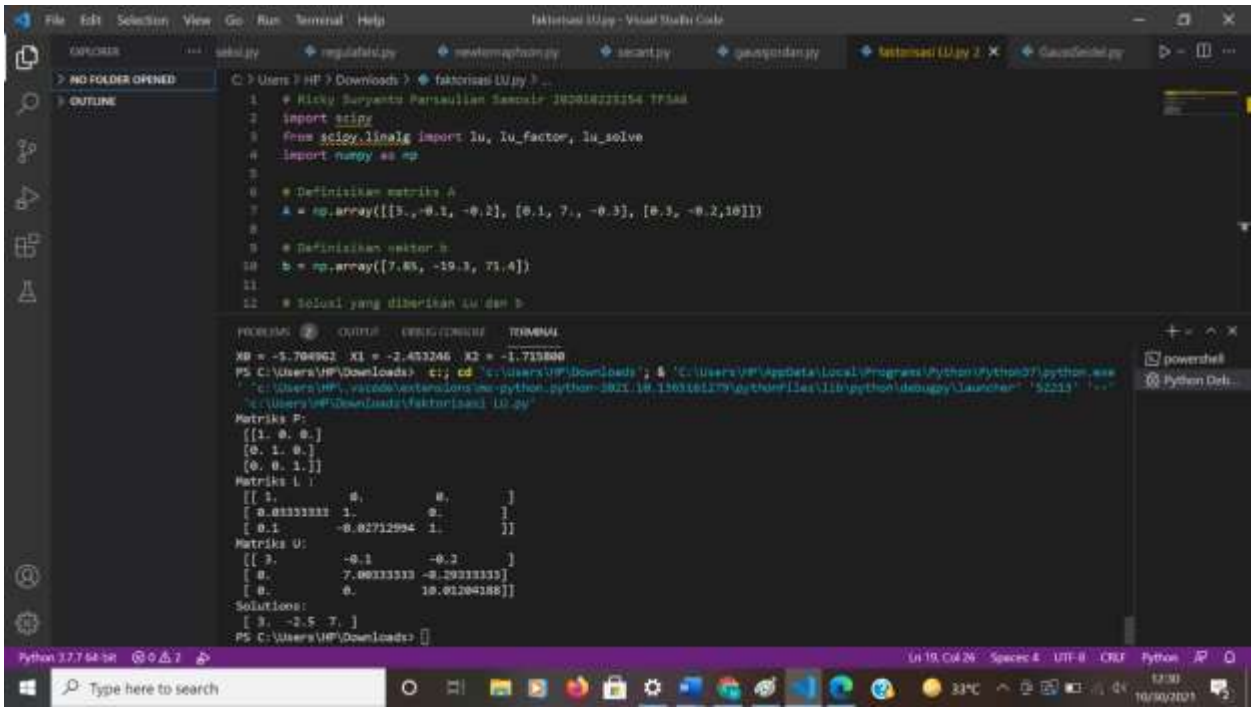
1.2 METODE FAKTORISASI LU



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Codingnya:

```
# Ricky Suryanto Parsaulian Samosir 202010225254 TF3A6
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)
```

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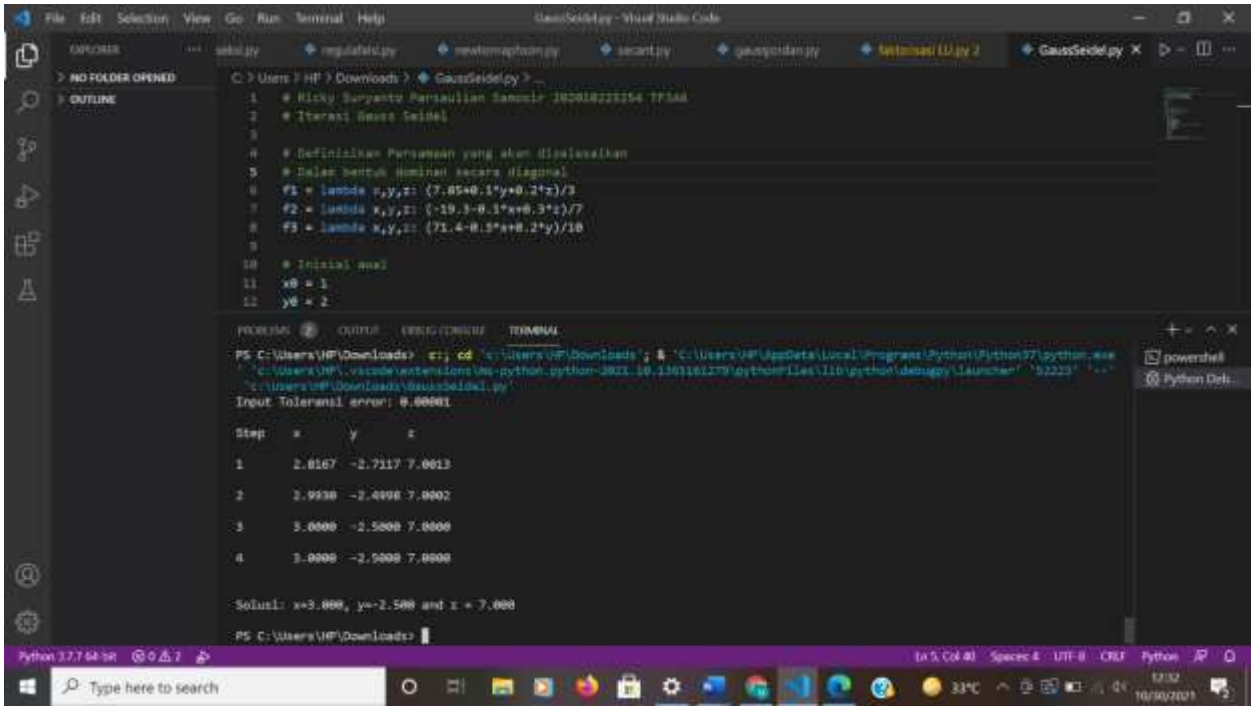
1.3 METODE GAUSS SEIDEL



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Codingnya:

```
# Ricky Suryanto Parsaulian Samosir 202010225254 TF3A6
# Iterasi Gauss Seidel

# 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))
```