29 Oktober 21

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Kelas : TIF 3A4

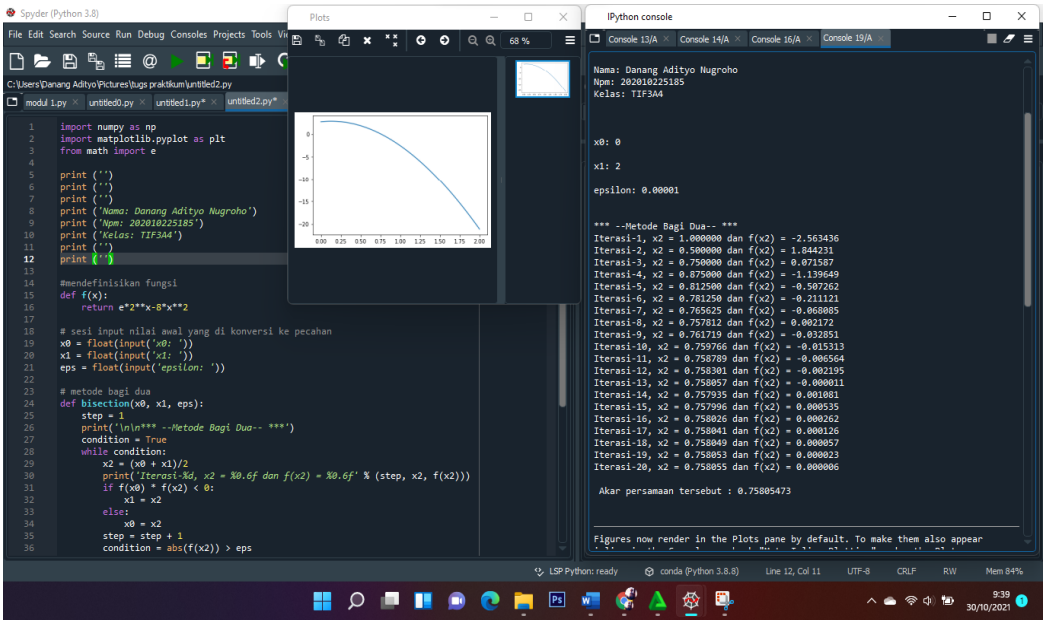
Npm : 202010225185

Tugas

Solusi Persamaan Non Linear

Pertanyaan :

- Bisection (bagi dua)



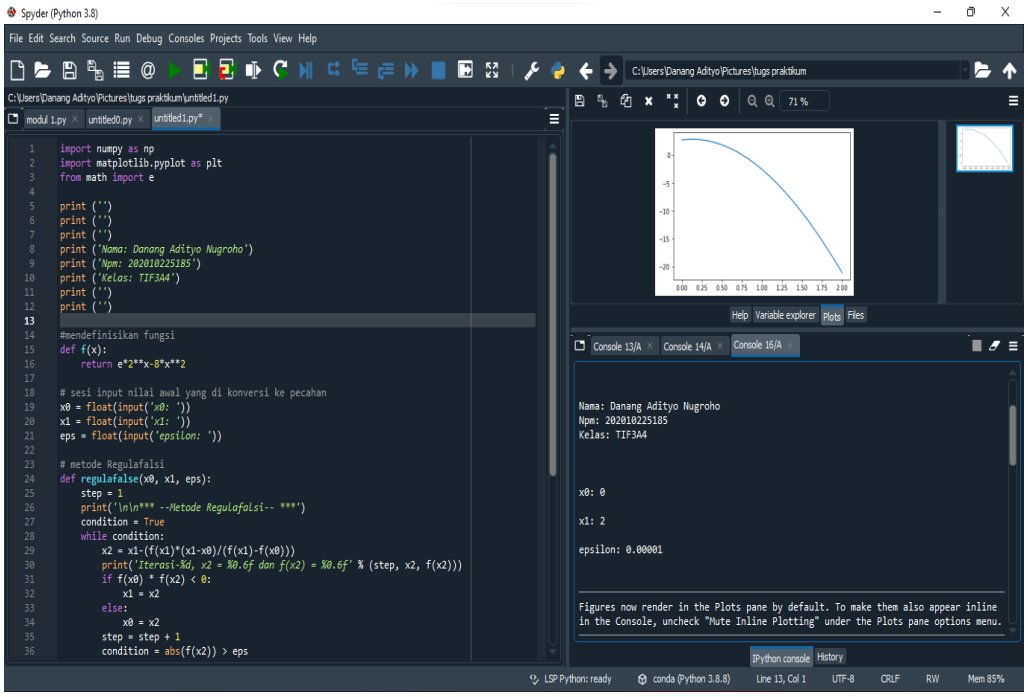
Coding Bisection (bagi dua)

```
import numpy as np

import matplotlib.pyplot as plt

from math import e


print ('')
```

```
print ('')

print ('')

print ('Nama: Danang Adityo Nugroho')

print ('Npm: 202010225185')

print ('Kelas: TIF3A4')

print ('')

print ('')


#mendefinisikan fungsi

def f(x):

    return e*2**x-8*x**2

# sesi input nilai awal yang di konversi ke pecahan

x0 = float(input('x0: '))

x1 = float(input('x1: '))

eps = float(input('epsilon: '))


# metode bagi dua

def bisection(x0, x1, eps):

    step = 1

    print('\n\n*** --Metode Bagi Dua-- ***')

    condition = True

    while condition:

        x2 = (x0 + x1)/2

        print('Iterasi-%d, x2 = %0.6f dan f(x2) = %0.6f' % (step, x2, f(x2)))
```

```
        if f(x0) * f(x2) < 0:
            x1 = x2
        else:
            x0 = x2
        step = step + 1
        condition = abs(f(x2)) > eps


    print('\n Akar persamaan tersebut : %0.8f' % x2)
# pengecekan nilai awal
if f(x0) * f(x1) > 0.0:
    print('Nilai yang di prediksi tidak mengurung akar')
    print('Silahkan mencoba ulang prediksi nilai baru')
    print()
else:
    bisection(x0, x1, eps)
#  menggambar fungsi
rr = np.linspace(0, 2, 100)  # masukkan nilai tebakan awal
plt.plot(rr, f(rr))
plt.show()
plt.savefig("biseksi.png")  # untuk menyimpan gambar fungsi
```

- Regulafalsi



Coding Regulafalsi

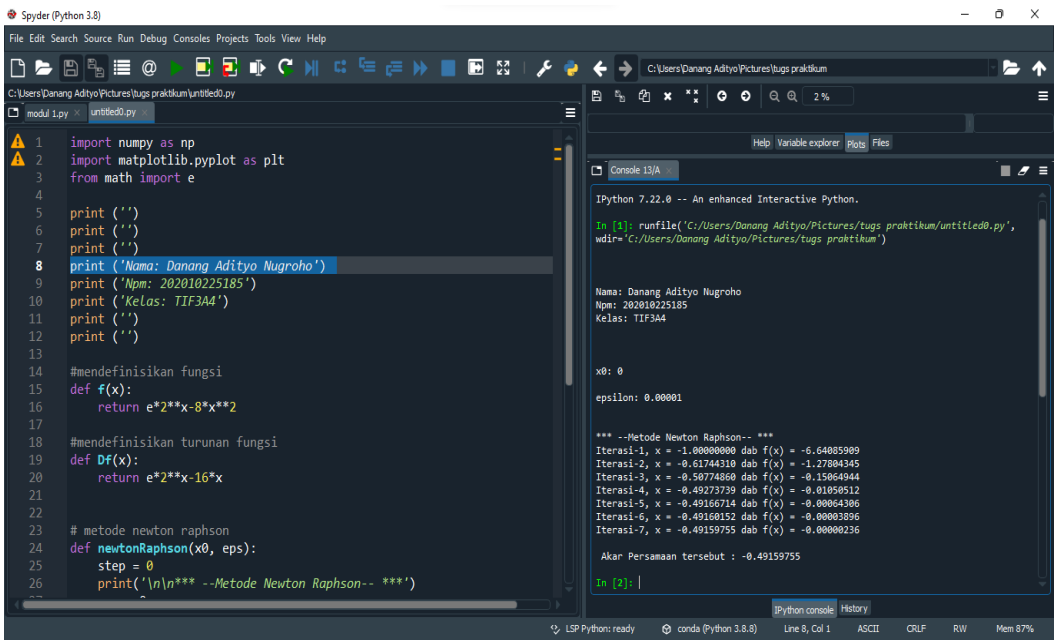
```
import numpy as np

import matplotlib.pyplot as plt

from math import e

print ('')

print ('')

print ('')

print ('Nama: Danang Adityo Nugroho')

print ('Npm: 202010225185')

print ('Kelas: TIF3A4')

print ('')

print ('')
```

```
#mendefinisikan fungsi

def f(x):
```

```
    return e*2**x-8*x**2


# sesi input nilai awal yang di konversi ke pecahan
x0 = float(input('x0: '))
x1 = float(input('x1: '))
eps = float(input('epsilon: '))


# metode Regulafalsi
def regulafalse(x0, x1, eps):
    step = 1
    print('\n\n*** --Metode Regulafalsi-- ***')
    condition = True
    while condition:
        x2 = x1-(f(x1)*(x1-x0)/(f(x1)-f(x0)))
        print('Iterasi-%d, x2 = %0.6f dan f(x2) = %0.6f' % (step, x2, f(x2)))
        if f(x0) * f(x2) < 0:
            x1 = x2
        else:
            x0 = x2
        step = step + 1
        condition = abs(f(x2)) > eps


    print('\n Akar persamaan tersebut : %0.8f' % x2)
# Menggambar fungsi
```

```
rr= np.linspace(0,2,100) # masukan nilai tebakan awal
plt.plot(rr,f(rr))
plt.show()
plt.savefig("regulafalsi.png")


# pengecekan nilai awal
if f(x0) * f(x1) > 0.0:
   print('Nilai yang di prediksi tidak mengurung akar')
   print('Silahkan mencoba ulang prediksi nilai baru')
else:
   regulafalse(x0, x1, eps)
```

- Newton Raphson

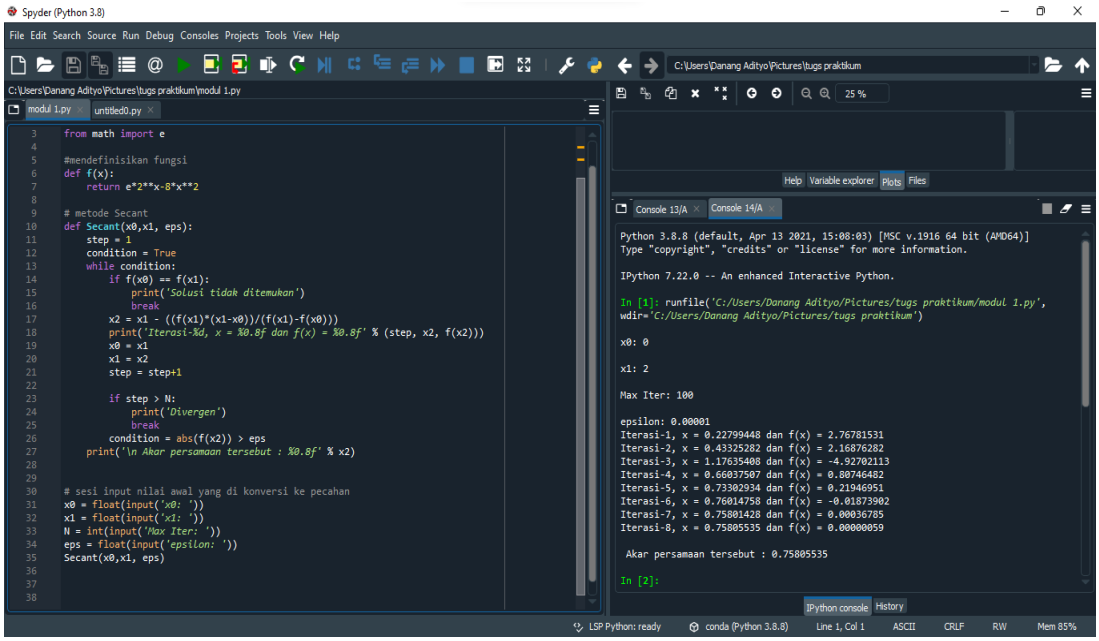


Coding netwon Raphson :

```
import numpy as np
```

```
import matplotlib.pyplot as plt
from math import e

#mendefinisikan fungsi
def f(x):
   return e*2**x-8*x**2

#mendefinisikan turunan fungsi
def Df(x):
   return e*2**x-16*x


# metode newton raphson
def newtonRaphson(x0, eps):
   step = 0
   print('\n\n*** --Metode Newton Raphson-- ***')
   xn = x0
   for n in range(0,100): #maksimal iterasi adalah 100
      fxn=f(xn)
      if abs(fxn)<eps:
         print('\n Akar Persamaan tersebut : %0.8f' % xn)
         return xn
      Dfxn = Df(xn)
      if Dfxn == 0:
         print('Solusi tidak ditemukan')
         return None
      xn = xn-(fxn/Dfxn)
      step = step + 1
      print('Iterasi-%d, x = %0.8f dab f(x) = %0.08f' % (step,xn,f(xn)))
   print('Iterasi maksimum, solusi tidak ditemukan')


# sesi input nilai awal yang di konversi ke pecahan
x0 = float(input('x0: '))
eps = float(input('epsilon: '))
newtonRaphson(x0, eps)
```

- Secant



Coding Secanf

```
import numpy as np
import matplotlib.pyplot as plt
from math import e


#mendefinisikan fungsi
def f(x):
    return e*2**x-8*x**2


# metode Secant
def Secant(x0,x1, eps):
    step = 1
    condition = True
    while condition:
        if f(x0) == f(x1):
            print('Solusi tidak ditemukan')
            break
        x2 = x1 - ((f(x1)*(x1-x0))/(f(x1)-f(x0)))
        print('Iterasi-%d, x = %0.8f dan f(x) = %0.8f' % (step, x2, f(x2)))
```

```
    x0 = x1
    x1 = x2
    step = step+1

    if step > N:
        print('Divergen')
        break
    condition = abs(f(x2)) > eps
  print('\n Akar persamaan tersebut : %0.8f' % x2)
# sesi input nilai awal yang di konversi ke pecahan
x0 = float(input('x0: '))
x1 = float(input('x1: '))
N = int(input('Max Iter: '))
eps = float(input('epsilon: '))
Secant(x0,x1, eps)
```