Nama : Chaidar Atha Rayu Pratama

Kelas : TRE21

NIM : 2103022460052

Tugas 2 Pertemuan 1

A. Jumlah hingga deret

2) $\sum_{n=1}^{\infty} \frac{n}{3^n}$ $\quad a_n = \frac{n}{3^n}$ $\quad a_{n+1} = \frac{n+1}{3^{n+1}}$

$$\rho_n = \left| \frac{a_{n+1}}{a_n} \right| = \left| \frac{\frac{n+1}{3^{n+1}}}{\frac{n}{3^n}} \right| = \left| \frac{(n+1)3^n}{3^{n+1} n} \right| = \left| \frac{n+1}{3n} \right| = \left| \frac{n+1}{3n} \right|$$

$$\rho = \lim_{n \to \infty} \rho_n$$

$$= \lim_{n \to \infty} \left| \frac{n+1}{3n} \right| = \frac{1}{3} \lim_{n \to \infty} \left(\frac{n+1}{n} \right) = \frac{1}{3} \lim_{n \to \infty} \left(1 + \frac{1}{n} \right) = \frac{1}{3}(1+0) = \frac{1}{3}$$

a_n konvergen

$\rho < 1$

$\frac{1}{3} < 1$

$\therefore \sum_{n=1}^{\infty} \frac{n}{3^n}$ deret konvergen

B. Deret maclaurin

2) $x\sqrt{1+x}$

$f(x) = x\sqrt{1+x}$

$f(0) = 0\sqrt{1+0} = 0$

• titik $a = 0$

$$\Rightarrow f(x) = f(0) + \frac{f'(0)}{1!}(x) + \frac{f''(0)}{2!}(x^2) + \frac{f'''(0)}{3!}(x^3) + \dots$$

$\Rightarrow f(0) = 0$

• $f'(x) = \frac{d}{dx}(x + x\sqrt{1+x})$

$f'(0) = \frac{3x+2}{2\sqrt{1+x}} = 1$

$f''(x) = \frac{d^2}{dx^2}(x\sqrt{1+x})$

$f''(0) = \frac{1x+5}{4(1+1)\sqrt{1+x}} = 1$

$\Rightarrow f'''(x) = \frac{d^3}{dx^3}(x\sqrt{1+x})$

$f'''(0) = -\frac{3(x+2)}{8(x+1)^{\frac{5}{2}}} = -\frac{3}{4}$

• $f^{IV}(x) = \frac{dx^5}{dx^5}(x\sqrt{1+x})$

$f^{IV}(x) = -\frac{15(3x+4)}{32(x+1)^{\frac{9}{2}}}$

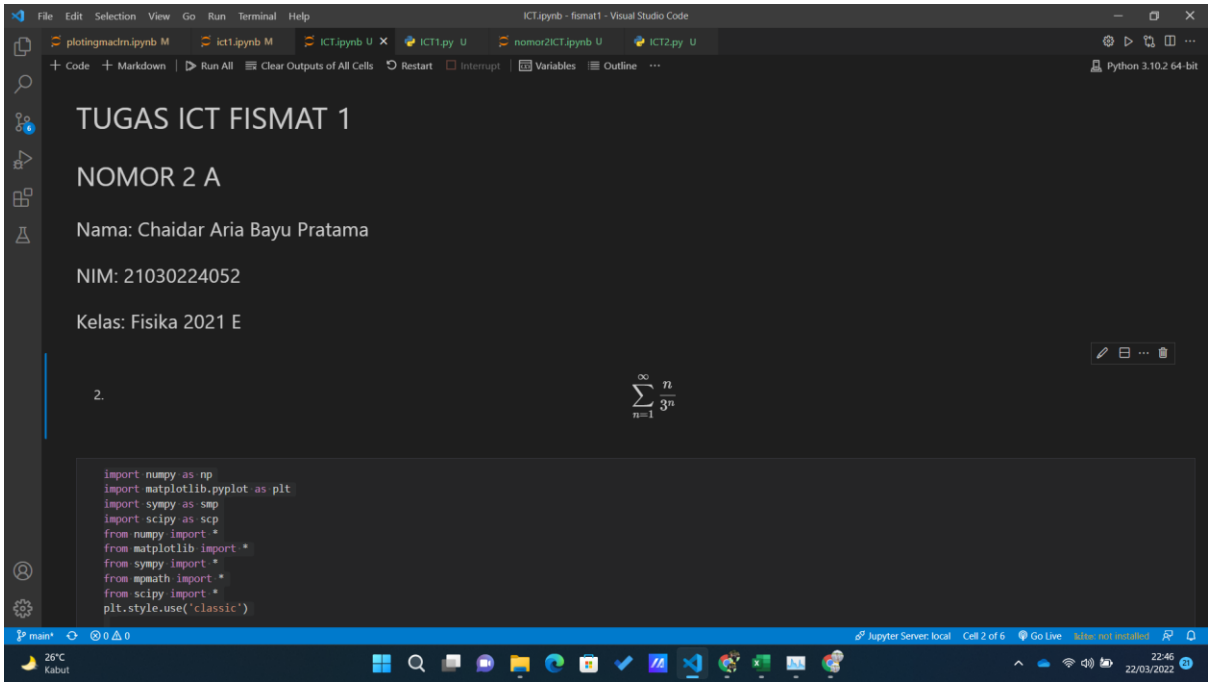
$= -\frac{75}{16}$

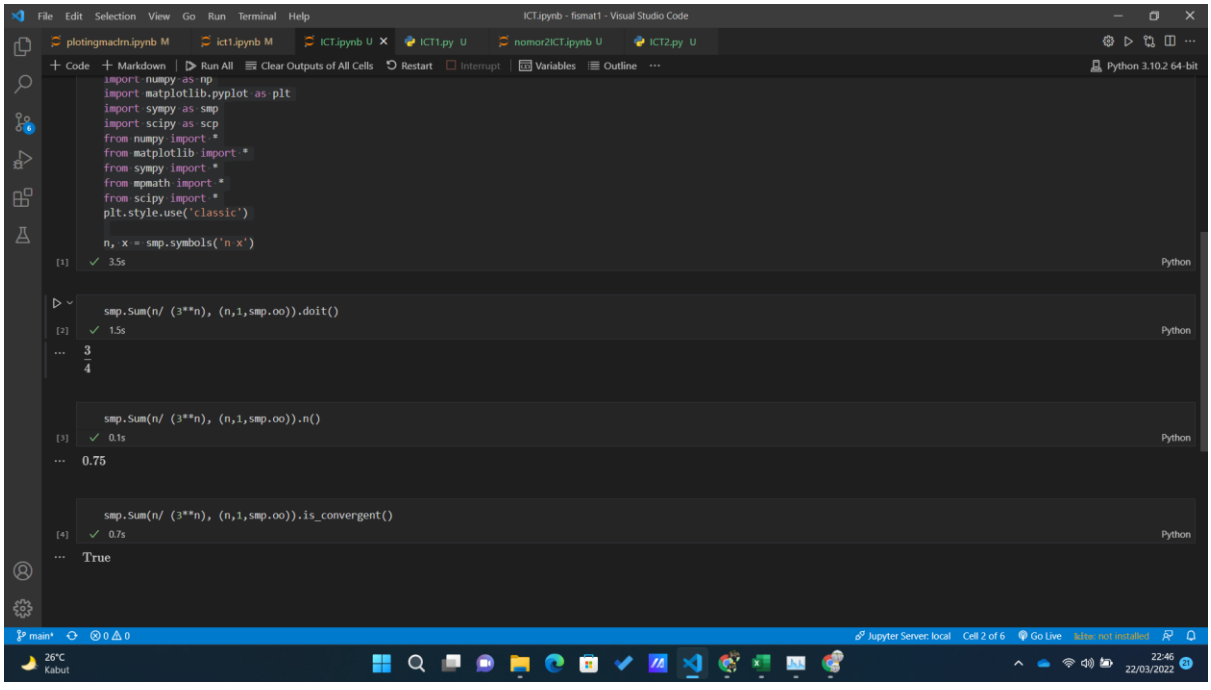
• $f^{IV}(x) = \frac{dx^5}{dx^5}(x\sqrt{1+x})$

$f^{IV}(0) = -\frac{3(-3x-0)}{16(x+1)^{\frac{7}{2}}} = \frac{3}{2}$

a) $f(0) = 0 + \frac{1}{1!}x + \frac{1}{2!}x^2 + \frac{-\frac{3}{4}}{3!}x^3 + \frac{\frac{3}{2}}{4!}x^4 + \frac{-\frac{75}{16}}{5!}x^5 + \dots$

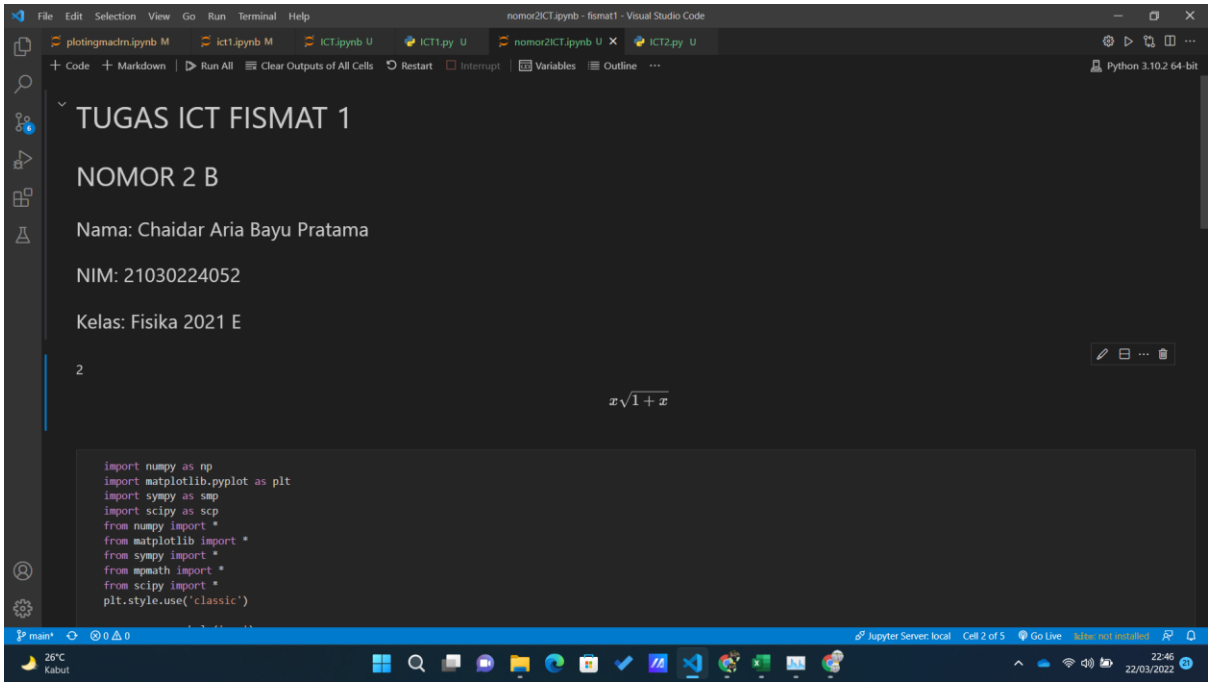
$f(x) = x + \frac{1}{2}x^2 - \frac{1}{8}x^3 + \frac{1}{16}x^4 - \frac{5}{128}x^5 + \dots$

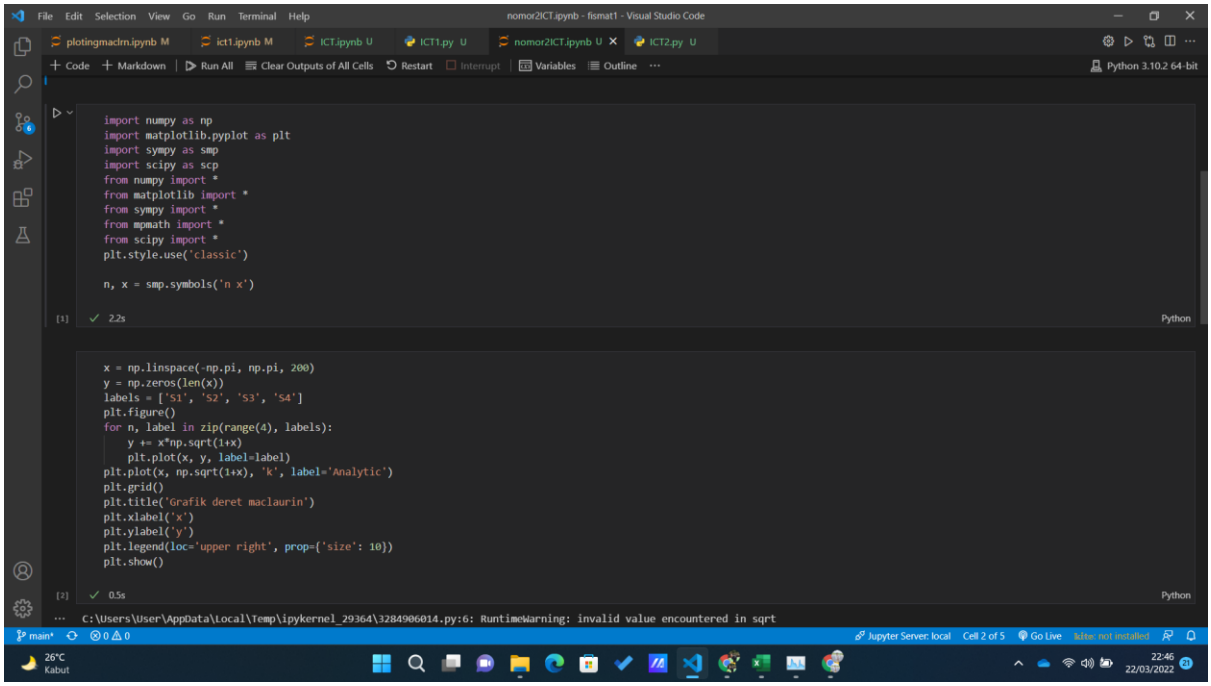


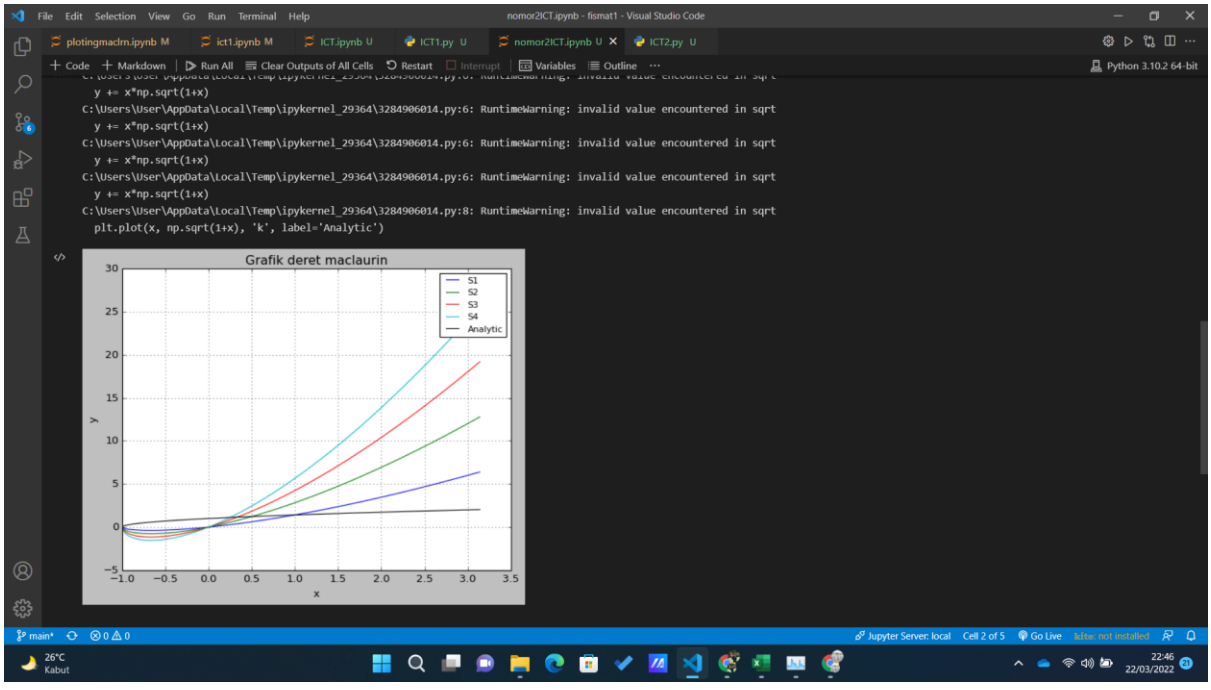



```
# %% [markdown]
# # TUGAS ICT FISMAT 1
# ## NOMOR 2 A
# ### Nama: Chaidar Aria Bayu Pratama
# ### NIM: 21030224052
# ### Kelas: Fisika 2021 E

# %% [markdown]
# 2. $$\sum_{n=1}^{\infty}\frac{n}{3^n}$$

# %%
import numpy as np
```

```
import matplotlib.pyplot as plt
import sympy as smp
import scipy as scp
from numpy import *
from matplotlib import *
from sympy import *
from mpmath import *
from scipy import *
plt.style.use('classic')

n, x = smp.symbols('n x')

# %%
smp.Sum(n / (3**n), (n, 1, smp.oo)).doit()

# %%
smp.Sum(n / (3**n), (n, 1, smp.oo)).n()

# %%
smp.Sum(n / (3**n), (n, 1, smp.oo)).is_convergent()
```

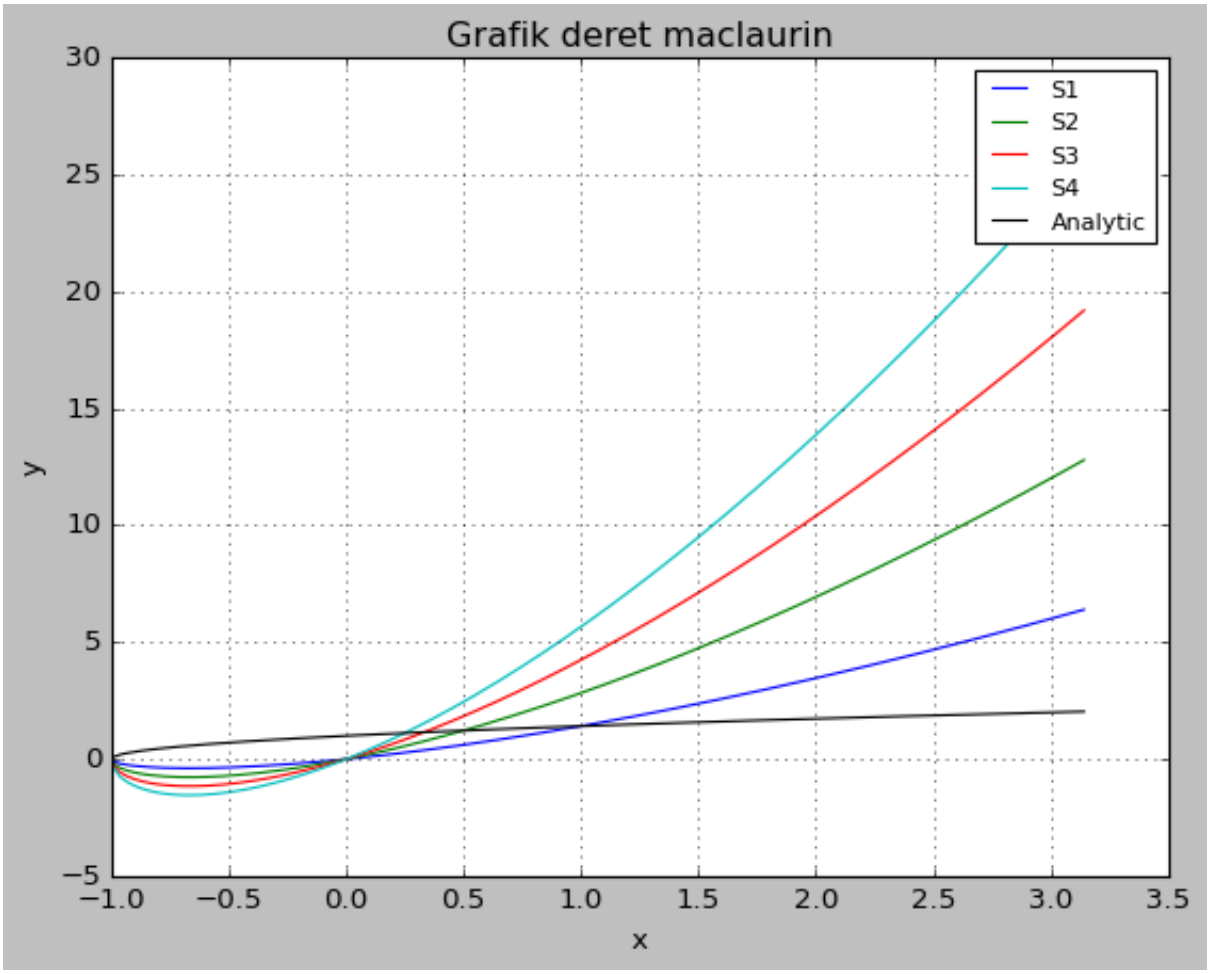







```
# %% [markdown]
# # TUGAS ICT FISMAT 1
# ## NOMOR 2 B
# ### Nama: Chaidar Aria Bayu Pratama
# ### NIM: 21030224052
# ### Kelas: Fisika 2021 E

# %% [markdown]
# 2
# $$x\sqrt{1+x}$$

# %%
```

```
import numpy as np
import matplotlib.pyplot as plt
import sympy as smp
import scipy as scp
from numpy import *
from matplotlib import *
from sympy import *
from mpmath import *
from scipy import *
plt.style.use('classic')

n, x = smp.symbols('n x')


# %%
x = np.linspace(-np.pi, np.pi, 200)
y = np.zeros(len(x))
labels = ['S1', 'S2', 'S3', 'S4']
plt.figure()
for n, label in zip(range(4), labels):
    y += x*np.sqrt(1+x)
    plt.plot(x, y, label=label)
plt.plot(x, np.sqrt(1+x), 'k', label='Analytic')
plt.grid()
plt.title('Grafik deret maclaurin')
plt.xlabel('x')
plt.ylabel('y')
plt.legend(loc='upper right', prop={'size': 10})
plt.show()


# %%
```


Grafik deret maclaurin
S1
S2
S3
S4
Analytic
y
x
30
25
20
15
10
5
0
−5
−1.0
−0.5
0.0
0.5
1.0
1.5
2.0
2.5
3.0
3.5