

Vedlegg B3 Python skript

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import pandas as pd
import numpy as np
from scipy.integrate import simps
import matplotlib
matplotlib.use('TkAgg')
import matplotlib.pyplot as plt

# Read in the CSV data with semicolon delimiter and comma as decimal separator
df = pd.read_csv('C:/_NTNU skrivebord/NTNU 3. klasse/Semester 6/Bachelor/Modellering.csv',
delimiter=';', decimal=',')

# Define the x values
length = 360
x = df['n'][:length]

# Define the y values for datasets 1 to 6
y1 = df['y_1'][:length]
y2 = df['y_2'][:length]
y3 = df['y_3'][:length]
y4 = df['y_4'][:length]
y5 = df['y_5'][:length]
y6 = df['y_6'][:length]

# Calculate the integrals for datasets 1 to 6 using Simpson's rule
integral1 = simps(y1, x)
integral2 = simps(y2, x)
integral3 = simps(y3, x)
integral4 = simps(y4, x)
integral5 = simps(y5, x)
integral6 = simps(y6, x)

# Create a figure with two subplots
fig, ((ax1, ax2), (ax3, ax4)) = plt.subplots(2, 2, figsize = (10, 6))

# Plot datasets 1 and 3 on the first subplot
ax1.plot(x, y1, label = 'Node 1 før utbygging', color = 'blue')
ax1.plot(x, y3, label = 'Node 1 etter utbygging', color = 'green')

# Shade the area between the graphs
ax1.fill_between(x, y1, y3, where = y1 >= y3, interpolate = True, color = 'lightgreen', alpha = 0.5)
ax1.fill_between(x, y1, y3, where = y1 < y3, interpolate = True, color = 'salmon', alpha = 0.5)

# Add a textbox with the integral of the shaded area
ax1.text(0.5, 0.5, f'Differanse: {abs(integral1-integral3):.2f}', fontsize=12,
transform = ax1.transAxes, bbox = dict(facecolor = 'white', edgecolor = 'black', alpha=0.5))

# Set the title and axis labels for the first subplot
ax1.set_title('Node 1: Total innstrømningsrate, \n før og etter utbygging')
ax1.set_xlabel('Minutt')
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ax1.set_ylabel('l/s')
ax1.set_xlim(10,91)
ax1.grid()
ax1.legend()

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# Plot datasets 2 and 4 on the first subplot
ax2.plot(x, y2, label = 'Node 2 før utbygging', color = 'orange')
ax2.plot(x, y4, label = 'Node 2 etter utbygging', color = 'red')

# Shade the area between the graphs
ax2.fill_between(x, y2, y4, where = y2 >= y4, interpolate = True, color = 'lightgreen', alpha = 0.5)
ax2.fill_between(x, y2, y4, where = y2 < y4, interpolate = True, color = 'salmon', alpha = 0.5)

# Add a textbox with the integral of the shaded area
ax2.text(0.5, 0.5, f'Differanse: {abs(integral2-integral4):.2f}', fontsize=12,
        transform = ax2.transAxes, bbox = dict(facecolor = 'white', edgecolor = 'black', alpha=0.5))

# Set the title and axis labels for the first subplot
ax2.set_title('Node 2: Total innstrømningsrate, \n før og etter utbygging')
ax2.set_xlabel('Minutt')
ax2.set_ylabel('l/s')
ax2.set_xlim(10,91)
ax2.grid()
ax2.legend()

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# Plot datasets 1 and 5 on the first subplot
ax3.plot(x, y1, label = 'Node 1 før utbygging', color = 'blue')
ax3.plot(x, y5, label = 'Node 1 med tiltak', color = 'green')

# Shade the area between the graphs
ax3.fill_between(x, y1, y5, where = y1 >= y5, interpolate = True, color = 'lightgreen', alpha = 0.5)
ax3.fill_between(x, y1, y5, where = y1 < y5, interpolate = True, color = 'salmon', alpha = 0.5)

# Add a textbox with the integral of the shaded area
ax3.text(0.5, 0.5, f'Differanse: {abs(integral1-integral5):.2f}', fontsize=12,
        transform = ax3.transAxes, bbox = dict(facecolor = 'white', edgecolor = 'black', alpha=0.5))

# Set the title and axis labels for the first subplot
ax3.set_title('Node 1: Total innstrømningsrate, \n før utbygging, med tiltak')
ax3.set_xlabel('Minutt')
ax3.set_ylabel('l/s')
ax3.set_xlim(10,91)
ax3.grid()
ax3.legend()

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# Plot datasets 2 and 6 on the first subplot
ax4.plot(x, y2, label = 'Node 2 før utbygging', color = 'orange')
ax4.plot(x, y6, label = 'Node 2 etter utbygging', color = 'red')

# Shade the area between the graphs
ax4.fill_between(x, y2, y6, where = y2 >= y6, interpolate = True, color = 'lightgreen', alpha = 0.5)
ax4.fill_between(x, y2, y6, where = y2 < y6, interpolate = True, color = 'salmon', alpha = 0.5)

# Add a textbox with the integral of the shaded area
ax4.text(0.5, 0.5, f'Differanse: {abs(integral2-integral6):.2f}', fontsize=12,
        transform = ax4.transAxes, bbox = dict(facecolor = 'white', edgecolor = 'black', alpha=0.5))

# Set the title and axis labels for the first subplot
ax4.set_title('Node 2: Total innstrømningsrate, \n før utbygging, etter tiltak')
ax4.set_xlabel('Minutt')
ax4.set_ylabel('l/s')
ax4.set_xlim(10,91)
ax4.grid()
ax4.legend()

# Adjust the layout and spacing of the subplots
plt.tight_layout()

# Show the plot and save figure
plt.show()
plt.savefig('C:/_NTNU skrivebord/NTNU 3. klasse/Semester 6/Bachelor/figure.png')

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