Praktikum Fisika Komputasi

Modul 10 Machine Learning Regresi Linear dan Polinomial

Mochamad Zakiyal Huda 1227030021

```python
import numpy as np

import matplotlib.pyplot as plt

from sklearn.linear_model import LinearRegression

from sklearn.preprocessing import PolynomialFeatures

from sklearn.metrics import mean_squared_error

from sklearn.model_selection import train_test_split


X=[1,2,3,4,5,6,7,8,9,10]

Y=[3,7,13,21,31,43,57,73,91,111]


X = np.array(X).reshape(-1, 1)


X_train,X_test,Y_train,Y_test=train_test_split(X,Y,test_size=0.2,random_state
=42)


linear_model=LinearRegression()

linear_model.fit(X_train,Y_train)


poly_features_2=PolynomialFeatures(degree=2)

X_train_poly_2=poly_features_2.fit_transform(X_train)

poly_model_2=LinearRegression()

poly_model_2.fit(X_train_poly_2,Y_train)


X_sorted=np.sort(X,axis=0)
```

```python
Y_pred_linear_all=linear_model.predict(X_sorted)

Y_pred_poly_2_all=poly_model_2.predict(poly_features_2.transform(X_sorted))


mse_linear=mean_squared_error(Y_test,linear_model.predict(X_test))

mse_poly_2=mean_squared_error(Y_test,poly_model_2.predict(poly_features_2.transform(X_test)))


print(f"Mean squared error Linear: {mse_linear:.2f}")

print(f"Mean squared error Polynomial degree 2: {mse_poly_2:.2f}")


plt.figure(figsize=(10,6))

plt.scatter(X_train,Y_train,color='blue',label='Data Latih')

plt.scatter(X_test,Y_test,color='orange',label='Data Uji')

plt.plot(X_sorted,Y_pred_linear_all,color='red',label='Regresi Linear')

plt.plot(X_sorted,Y_pred_poly_2_all,color='green',label='Regresi polinomial derajat 2')

plt.xlabel('X')

plt.ylabel('Y')

plt.title("Regresi Linear dan Polinomial derajat 2 (Data latih dan Data Uji)")

plt.legend()

plt.show()
```

Mean squared error Linear: 25.00
Mean squared error Polynomial degree 2: 0.00

Regresi Linear dan Polinomial derajat 2 (Data latih dan Data Uji)