

PRAKTIKUM FISIKA KOMPUTASI
MACHINE LEARNING DEGRESI POLINOMIAL

KODE PROGRAM

```
import numpy as np
from sklearn.linear_model import LinearRegression

x = [[2], [4], [6], [8], [10], [12], [14], [16], [18], [20]]
y = [1, 4, 7, 10, 13, 16, 19, 21, 24, 27]

regr = LinearRegression().fit(x,y)
regr.score(x,y)

predict = np.array([[6]])

print ("Prediksi")
print ("Input = ", predict)
print ("Output = ", regr.predict(predict))
```

```
Prediksi
Input =  [[6]]
Output =  [7.01818182]
```

```
from sklearn.preprocessing import PolynomialFeatures
from sklearn import linear_model
import numpy as np

x = [[1], [2], [3], [4], [5], [6], [7], [8], [9], [10]]
y = [3, 7, 13, 21, 31, 43, 57, 73, 91, 111]

predict = np.array ([[12]])
poly = PolynomialFeatures(degree=2)
x_ = poly.fit_transform(x)
predict_ = poly.fit_transform(predict)
regr = linear_model.LinearRegression()
regr.fit(x_, y)

print ("Prediksi")
print ("Input = ", predict)
print ("Output = ", regr.predict(predict_))
```

```
Prediksi
```

```
Input =  [[12]]  
Output =  [157.]
```

```
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  
  
np.random.seed(0)  
X = np.linspace(0, 6, 100).reshape(-1, 1)  
Y = 2 * X**2 + 3 * X + 5 + np.random.randn(100, 1) * 3  
  
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)  
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
```

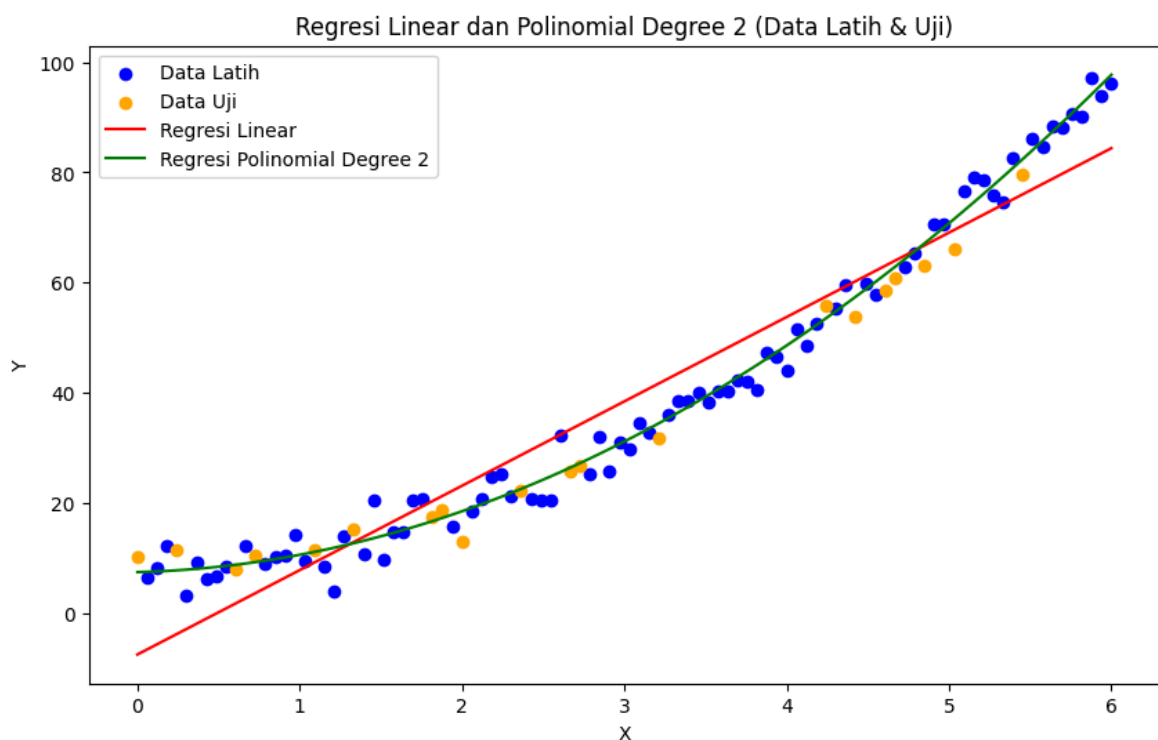
```

Linear')
plt.plot(X_sorted, Y_pred_poly_2_all, color='green', label='Regresi
Polinomial Degree 2')
plt.xlabel('X')
plt.ylabel('Y')
plt.title('Regresi Linear dan Polinomial Degree 2 (Data Latih &
Uji)')
plt.legend()
plt.show()

```

Mean Squared Error (Linear): 56.32

Mean Squared Error (Polynomial Degree 2): 7.78



PENJELASAN

Dari kode program yang dibuat, terdapat dua prediksi pada input dan output. nilai prediksi pada regresi linear dan regresi polinomial memiliki jumlah yang berbeda karena berdasarkan database yang berbeda, hal ini juga mendapatkan nilai MSE yang berbeda pada linear dan polinomial. Terdapat grafik yang didapatkan pada pengujian tersebut bahwa titik pada data latih berjumlah lebih banyak dibandingkan dengan data uji.