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In [2]: import numpy as np
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import PolynomialFeatures
import pandas as pd
from tabulate import tabulate
%matplotlib inline
```

```
In [3]: train = pd.read_csv('AirPassengers.csv')
```

```
In [25]: train['Month'] = pd.to_datetime(train['Month'], format='%Y-%m')
train['Year'] = train['Month'].dt.year
train.head()
```

```
Out[25]:
```

	Month	#Passengers	Year
0	1949-01-01	112	1949
1	1949-02-01	118	1949
2	1949-03-01	132	1949
3	1949-04-01	129	1949
4	1949-05-01	121	1949

```
In [26]: x = train['Year'].values.reshape(-1, 1)
y = train['#Passengers'].values
```

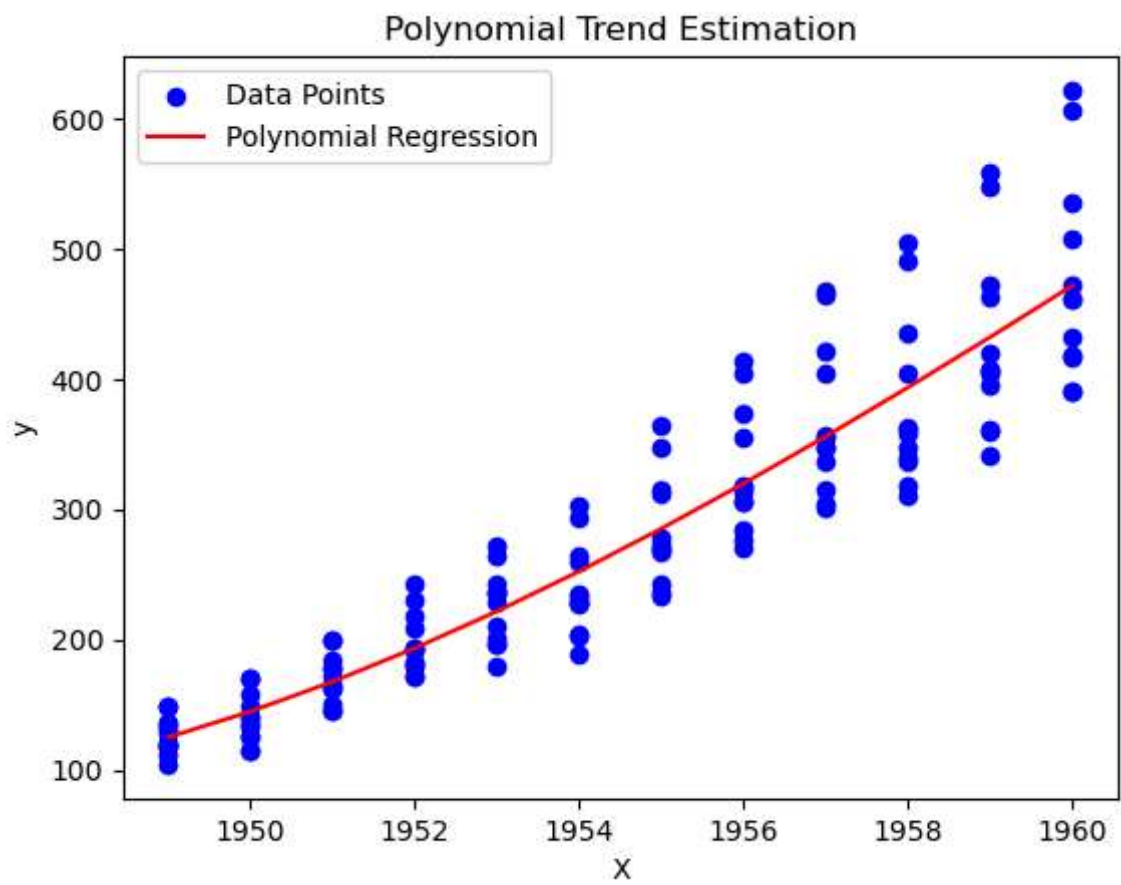
```
In [27]: poly = PolynomialFeatures(degree=3)
x_poly = poly.fit_transform(x)
```

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In [28]: model = LinearRegression()
model.fit(x_poly, y)
```

```
Out[28]: ▾ LinearRegression
LinearRegression()
```

```
In [29]: y_pred = model.predict(x_poly)
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In [30]: plt.scatter(x, y, color='blue', label='Data Points')
plt.plot(x, y_pred, color='red', label='Polynomial Regression')
plt.xlabel('X')
plt.ylabel('y')
plt.title('Polynomial Trend Estimation')
plt.legend()
plt.show()
```



In []: