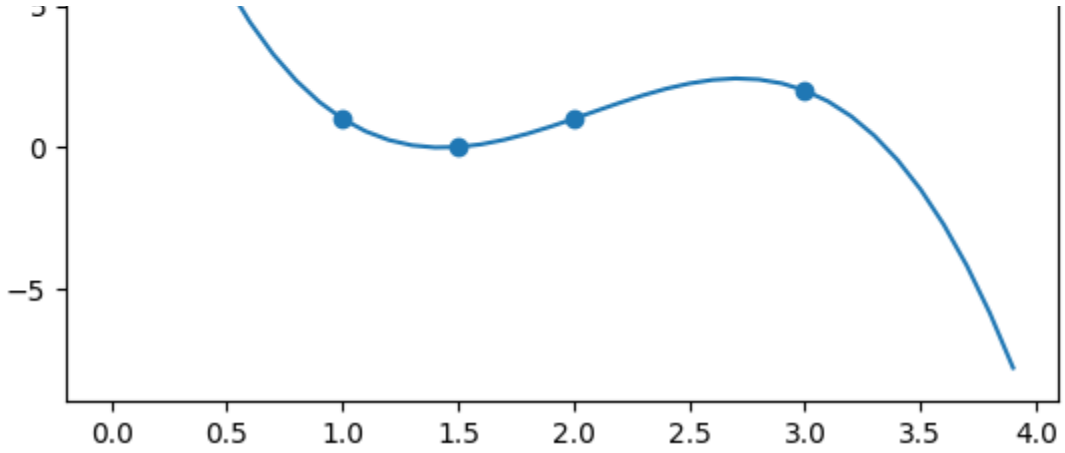
Double-click (or enter) to edit

```
import numpy as np
import matplotlib.pyplot as plt


f = np.array([[1, 1, 1, 1],
              [8, 4, 2, 1],
              [3.375, 2.25, 1.5, 1],
              [27, 9, 3, 1]])

y = np.array([[1],
              [1],
              [0],
              [2]])

w = np.linalg.inv(f.T.dot(f)).dot(f.T).dot(y)

print(w)
```

```
[[ -2.33333333]
 [ 14.5       ]
 [-27.16666667]
 [ 16.        ]]
```

```
x = np.reshape(np.arange(0,4, 0.1), (40,1))
f2 = np.hstack((x*x*x, x*x, x, np.ones((40,1))))
y_hat = f2.dot(w)


xy = np.array([[1, 1],
                      [2, 1],
                      [1.5, 0],
                      [3, 2]])

plt.scatter(xy[:, 0], xy[:, 1])
plt.plot(x,y_hat)
plt.show()
```




```
from sklearn.preprocessing import PolynomialFeatures

X = np.array([[0, 1],
              [2, 0],
              [1, 2]])

poly = PolynomialFeatures(2)
f = poly.fit_transform(X)
print(f)
```

```
[[1. 0. 1. 0. 0. 1.]
 [1. 2. 0. 4. 0. 0.]
 [1. 1. 2. 1. 2. 4.]]
```

```
from numpy import genfromtxt

stock_data = genfromtxt('stock_prediction_data_scaled.csv', delimiter=',')
stock_data
```

```
array([[ 0.039, -1.214, -0.715, ...,  0.953, -1.22 , -1.263],
       [ 0.281, -1.47 ,  0.499, ..., -0.344, -0.809, -0.841],
       [ 1.346, -0.352,  0.968, ...,  0.612, -0.559,  0.454],
       ...,
       [ 0.633,  1.083,  1.284, ...,  0.093, -0.7  , -0.675],
       [ 0.225, -0.98 , -0.138, ..., -0.542, -0.826, -1.639],
       [-0.189, -1.156,  0.526, ...,  0.612,  1.375, -1.432]])
```

```
stock_price = genfromtxt('stock_price.csv', delimiter=',')
stock_price
```

```
array([-3.100e-01, -1.686e+01,  1.360e+00,  1.275e+01,  7.910e+00,
       -2.750e+00, -5.400e-01, -1.151e+01, -4.010e+00,  3.080e+00,
       -8.230e+00, -1.400e-01,  2.560e+00, -6.870e+00,  4.430e+00,
        1.980e+00,  3.760e+00,  4.160e+00,  6.670e+00, -7.210e+00,
        3.220e+00,  1.100e+01, -2.150e+00,  6.330e+00, -4.350e+00,
        1.300e-01,  7.070e+00,  6.390e+00, -3.050e+00,  4.670e+00,
       -1.092e+01, -4.370e+00, -3.800e+00,  6.360e+00,  5.580e+00,
```

```
       -4.720e+00, -3.620e+00, -8.660e+00,  8.970e+00,  4.800e+00,
        6.470e+00,  3.380e+00, -1.280e+00, -1.309e+01, -1.160e+01,
        8.790e+00,  4.910e+00,  1.574e+01, -6.270e+00, -3.350e+00,
       -6.800e+00,  4.100e+00,  2.600e+00, -1.910e+00,  7.390e+00,
       -6.400e-01, -7.470e+00,  1.087e+01,  4.480e+00, -7.750e+00,
        9.720e+00,  1.480e+00,  1.137e+01, -3.020e+00,  8.970e+00,
       -4.960e+00,  1.330e+01,  2.940e+00,  8.380e+00, -2.730e+00,
        3.720e+00, -1.640e+00,  1.661e+01, -1.450e+00, -9.500e+00,
        5.760e+00,  5.230e+00, -1.345e+01,  1.114e+01,  3.490e+00,
        5.990e+00, -2.730e+00, -8.210e+00, -1.136e+01,  6.200e-01,
        2.870e+00,  1.263e+01, -6.680e+00,  1.212e+01, -3.750e+00,
        9.370e+00,  7.800e+00,  1.315e+01,  4.850e+00,  4.810e+00,
       -2.550e+00, -1.890e+00,  4.130e+00, -5.080e+00,  1.175e+01,
        1.145e+01, -4.560e+00,  7.800e+00,  8.890e+00,  4.060e+00,
       -1.980e+00,  2.620e+00, -8.160e+00, -2.170e+00, -5.240e+00,
        4.400e+00, -1.890e+00, -4.500e-01,  1.207e+01, -2.630e+00,
       -1.200e+00,  3.400e+00, -2.590e+00,  4.990e+00,  4.110e+00,
       -6.490e+00, -1.110e+00, -4.650e+00,  6.720e+00,  6.200e-01,
        2.890e+00, -2.350e+00,  3.950e+00,  1.930e+00, -3.820e+00,
        5.000e+00, -3.070e+00,  4.760e+00,  1.200e+00,  9.400e+00,
        8.840e+00, -9.540e+00,  1.246e+01, -7.000e-02, -5.130e+00,
        1.820e+00,  4.900e+00,  1.000e-02,  8.620e+00, -5.700e-01,
        1.736e+01,  3.440e+00,  1.790e+01, -2.680e+00,  1.720e+00,
       -5.100e-01,  2.240e+00,  8.320e+00,  1.507e+01, -1.062e+01,
       -1.630e+00, -1.233e+01,  8.050e+00, -9.910e+00,  1.103e+01,
        1.007e+01,  4.410e+00, -4.210e+00,  1.668e+01, -9.010e+00,
       -7.080e+00,  2.500e-01,  2.470e+00, -1.730e+00, -2.750e+00,
        6.450e+00, -2.390e+00, -9.360e+00, -1.860e+00,  9.770e+00,
       -1.260e+01,  1.728e+01,  6.500e+00,  7.860e+00,  4.490e+00,
        1.148e+01,  4.810e+00,  1.200e+01,  8.980e+00, -5.360e+00,
        7.560e+00, -6.000e-01, -2.800e+00,  1.050e+00,  5.600e-01,
        3.260e+00,  7.160e+00, -5.850e+00, -5.070e+00, -3.250e+00,
        3.350e+00, -7.920e+00,  4.890e+00,  5.360e+00,  4.420e+00,
       -7.030e+00, -4.160e+00, -9.820e+00,  1.159e+01,  5.200e-01,
       -3.850e+00,  3.000e-02,  8.500e-01,  1.297e+01, -3.210e+00,
        8.610e+00, -8.400e-01, -2.290e+00, -9.690e+00,  1.930e+00,
       -1.013e+01,  8.600e-01, -9.030e+00, -4.870e+00, -1.703e+01,
       -1.444e+01, -6.440e+00, -4.600e-01,  8.220e+00,  2.490e+00,
        8.810e+00,  2.820e+00,  4.500e-01,  1.011e+01,  2.630e+00,
        2.850e+00, -5.170e+00, -8.300e+00, -4.370e+00,  2.000e+00,
       -3.700e+00,  2.370e+00,  7.300e+00,  1.400e-01,  5.510e+00,
        2.390e+00, -1.750e+00,  2.500e-01,  3.750e+00,  1.084e+01,
       -8.000e+00, -8.150e+00,  1.020e+00,  9.500e-01,  1.510e+00,
       -5.530e+00, -8.110e+00, -1.130e+00, -2.500e-01, -8.580e+00,
        1.278e+01,  1.148e+01,  3.460e+00, -9.490e+00,  8.930e+00,
        5.140e+00, -4.330e+00, -1.670e+00,  1.340e+00,  9.800e-01,
       -1.315e+01,  1.031e+01,  4.800e-01,  9.440e+00,  2.700e+00,
       -8.240e+00, -1.960e+00, -9.080e+00,  4.450e+00, -1.220e+00,
       -9.900e-01,  5.100e+00,  6.950e+00,  7.440e+00,  1.463e+01,
       -1.514e+01, -4.200e+00, -7.210e+00, -1.720e+01,  1.530e+00,
       -1.520e+00,  5.870e+00, -1.530e+00, -9.070e+00, -2.470e+00,
```

```
w = np.linalg.inv(stock_data.T.dot(stock_data)).dot(stock_data.T).dot(stock_price)
```

```
w
```

```
w
```

```
y_pred = stock_data.dot(w)
Y = np.column_stack((y_pred, stock_price))
Y
```

```
array([[-1.14207086e+00, -3.10000000e-01],
       [-1.74997617e+01, -1.68600000e+01],
       [ 5.82796145e-01,  1.36000000e+00],
       [ 1.17425911e+01,  1.27500000e+01],
       [ 6.97993492e+00,  7.91000000e+00],
       [-3.89348225e+00, -2.75000000e+00],
       [-1.25491442e+00, -5.40000000e-01],
       [-1.18747698e+01, -1.15100000e+01],
       [-5.11771403e+00, -4.01000000e+00],
       [ 2.59234217e+00,  3.08000000e+00],
       [-8.99691146e+00, -8.23000000e+00],
       [-8.46765114e-01, -1.40000000e-01],
       [ 1.29214812e+00,  2.56000000e+00],
       [-7.87969530e+00, -6.87000000e+00],
       [ 3.73795276e+00,  4.43000000e+00],
       [ 9.31341907e-01,  1.98000000e+00],
       [ 2.91858128e+00,  3.76000000e+00],
       [ 3.12287623e+00,  4.16000000e+00],
       [ 5.70696333e+00,  6.67000000e+00],
       [-7.95644560e+00, -7.21000000e+00],
       [ 2.42262387e+00,  3.22000000e+00],
       [ 9.82146950e+00,  1.10000000e+01],
       [-3.07921159e+00, -2.15000000e+00],
       [ 5.49332212e+00,  6.33000000e+00],
       [-5.48446316e+00, -4.35000000e+00],
       [-6.63226472e-01,  1.30000000e-01],
       [ 6.26108203e+00,  7.07000000e+00],
       [ 5.76130512e+00,  6.39000000e+00],
       [-4.05564321e+00, -3.05000000e+00],
       [ 4.19147315e+00,  4.67000000e+00],
       [-1.18383805e+01, -1.09200000e+01],
       [-5.13771593e+00, -4.37000000e+00],
       [-4.50174188e+00, -3.80000000e+00],
       [ 5.00726546e+00,  6.36000000e+00],
       [ 4.71550971e+00,  5.58000000e+00],
       [-5.79737760e+00, -4.72000000e+00],
       [-4.49874785e+00, -3.62000000e+00],
       [-9.79692138e+00, -8.66000000e+00],
       [ 7.80586652e+00,  8.97000000e+00],
       [ 4.07800930e+00,  4.80000000e+00],
       [ 5.63838959e+00,  6.47000000e+00],
       [ 2.98495662e+00,  3.38000000e+00],
       [-1.98636567e+00, -1.28000000e+00],
       [-1.41760768e+01, -1.30900000e+01],
       [-1.25259481e+01, -1.16000000e+01],
       [ 8.12036778e+00,  8.79000000e+00],
       [ 3.67568436e+00,  4.91000000e+00],
       [ 1.46363967e+01,  1.57400000e+01],
       [-7.09916010e+00, -6.27000000e+00],
```

```
       [-4.20280619e+00, -3.35000000e+00],
       [-7.82874011e+00, -6.80000000e+00],
       [ 3.61910238e+00,  4.10000000e+00],
       [ 1.74213675e+00,  2.60000000e+00],
       [-2.89955792e+00, -1.91000000e+00],
       [ 6.60538624e+00,  7.39000000e+00],
       [-1.42972522e+00, -6.40000000e-01],
       [-8.23832098e+00, -7.47000000e+00],
       [ 1.03813148e+01,  1.08700000e+01],
```

```
sum = 0
for i in Y:
    sum += (i[0] - i[1]) ** 2

MSE = sum / Y.shape[0]
MSE
```

```
0.7936461393924641
```