```python
import h5py
import numpy as np
from PIL import Image
import matplotlib.pyplot as plt

file = h5py.File('points2D_Set2.mat', 'r')

# Plot to show how points are scattered
X=file['x']
Y=file['y']



mean_x = np.mean(X)
mean_y = np.mean(Y)

print(mean_x)
print(mean_y)

error_x = X - mean_x
error_y= Y - mean_y

cov_matrix = np.cov(error_x,error_y)

#eigenvalues eigenvectors


eigenvalues , eigenvectors = np.linalg.eig(cov_matrix)

# Find the index of the largest eigenvalue
max_eigenvalue_index = np.argmax(np.abs(eigenvalues))
print ("max eig index ",max_eigenvalue_index)


# Get the corresponding eigenvector
principal_axis = eigenvectors[:, max_eigenvalue_index]


# Calculate slope and intercept
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slope = principal_axis[1]/principal_axis[0]
intercept = mean_y - slope* mean_x
print("slope",slope)
print("intercept",intercept)

plt.scatter(X,Y)



# Line representing the linear relationship
line_x = np.linspace(np.min(X),np.max(X),num=100)
line_y = slope * line_x + intercept
plt.plot(line_x, line_y, color='red')

plt.legend()
plt.show()
```