Step by Step Computation of PCA

1) Computing the covariance matrix

eg) cv = np.cov(xy, rowvar=False)

2) Calculating the eigenvectors and eigenvalues

eg) import numpy.linalg as nl

[U,D,V] = nl.svd(cv) or [D, U] = nl.eig(cv)

id = np.argsort(D)[::-1]

U = U[:,id]

3) Computing the Principal Components

U = eigen vector, D = eigen value

Explained Variance : eg) var_pct = D/np.sum(D)*100

4) Projection to the new axis (PCs)

z = xy @ U