HW3 --- Part1

For the first 10000 data, when ALPHA is equal to 0.95. The reduced dimension of Linear Kernel is same as the Standard PCA one, which is 3. And for the eigenvalue, the linear kernel one is much greater than the Standard PCA .I also print the first two rows eigenvector and the first two columns eigenvector for the scatter points projection. The column eigenvector projection of Standard PCA is same as the linear kernel projection, which we can conclude the linear kernel PCA has the same meaning as the Standard PCA.

Chart, scatter chart

Description automatically generated

The first two rows of eigenvector projection

Chart, scatter chart

Description automatically generated

The first two columns of eigenvector projection Chart, scatter chart

Description automatically generated

For Gaussian Kernel PCA for the first 5000 data. (10k is too large)

Spread = 15000

A picture containing chart

Description automatically generated

Spread = 20000

A picture containing shape

Description automatically generated

Spread = 22000

Shape

Description automatically generated

The reduced dimension does not change too much, so I stopped.

HW3 --- Part2

When I randomly generate the data for two times, they all have the similar R^2 which is approximal to 0.16, a very small number.

A picture containing text

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Text

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