This homework is done by Tianwei Mo.

1. [1.5 2.5 3.5]
2. [[ 1.25 0.25 -1.25]

[ 0.25 0.75 0.75]

[-1.25 0.75 2.75]]

1. Eigenvalue = [3.56166464 1.1733803 0.01495506]

Eigenvectors =

[[-0.45056922 -0.6667717184 -0.59363515]

[ 0.19247228 -0.72187235 0.66472154]

[ 0.87174641 -0.18524476 -0.45358856]]

1. PCA coefficients = [[-2.95145599 -0.17610969 -0.0888421 ]

[ 1.37104342 -1.69406159 0.0198819 ]

[-0.30682473 0.78694448 0.19125108]

[ 1.8872373 1.0832268 -0.12229089]]

1. Xhat = [[3.0000000e+00 2.0000000e+00 1.0000000e+00]

[2.0000000e+00 4.0000000e+00 5.0000000e+00]

[1.0000000e+00 2.0000000e+00 3.0000000e+00]

[4.4408921e-16 2.0000000e+00 5.0000000e+00]]

1. Xhat =[[2.05905526 0.95970224]

[3.98678407 5.0090182 ]

[1.87287129 3.0867493 ]

[2.08128939 4.94453025]]

1. e = 0.014955061432806003

python code:

文本

描述已自动生成

* 1. x-u = [1, 3, 2]

a1 = v1^T \* (x-u) = 4/sqrt2

a2 = v2^T \* (x-u) = -2/sqrt2

* 1. Approximation = u + a1v1 + a2v2 = [1, 0, 2] + [2, 2, 0] + [-1, 1, 0] = [2, 3, 2]
  2. ||x - xhat||^2 = 4

1. The python code:

文本

描述已自动生成图形用户界面, 文本, 应用程序

描述已自动生成图形用户界面, 文本

中度可信度描述已自动生成

文本

描述已自动生成

1. The python function:

图形用户界面, 文本

中度可信度描述已自动生成