系统工程导论 主成分分析

一、运行结果

----------病态回归结果----------

为病态情况，m = 7

Linear Regression Outcome: beta =
  0.0031207
-0.00022934
-1.0825e-06
  -0.045562
  0.038652
  0.033332
-0.00022684
  -0.016451
 0.00029469
  0.044487
  0.16407
  0.10448
  0.041981
  0.27952
  0.026479

F=102.0985, F_a=1.6696, F>F_a, X and Y have Linear relation.
Half width of Confindence Interval1:12.8562
Confidence Interval1: [y_hat-12.8562, y_hat+12.8562]

----------PCA结果----------

Linear Regression Outcome: beta =
  44.0933
 -1.52242
 -1.54988
 -1.86627
 0.337768
 0.439176
 -1.37113

F=302.9339, F_a=2.0125, F>F_a, X and Y have Linear relation.
Half width of Confindence Interval1:11.5063
Confidence Interval1: [y_hat-11.5063, y_hat+11.5063]

二、思路分析

PCA 压缩：

归一化数据→ 计算协方差矩阵→计算特征值和特征向量并排序→根据相对误差界限
判断降维后的维数 m→得到主成分→沿主成分方向投影，数据压缩→储存原始数据的
方差和均值。

PCA 数据恢复
压缩后数据*投影矩阵的转置→去均值和方差