**MULTIVARIATE DATA ANALYSIS (*BIA 652)***

Spring 2017

Homework 7

**PRINCIPAL COMPONENT ANALYSIS**

Following is data from operation of a Plant for Oxidation of Ammonia to Nitric Acid.

|  |  |  |
| --- | --- | --- |
| **Air Flow** | **Inlet Water Temperature** | **Acid Concentration** |
| **X1** | **X2** | **X3** |
|  |  |  |
| 80 | 27 | 89 |
| 80 | 27 | 88 |
| 75 | 25 | 90 |
| 62 | 24 | 87 |
| 62 | 22 | 87 |
| 62 | 23 | 87 |
| 62 | 24 | 93 |
| 62 | 24 | 93 |
| 58 | 23 | 87 |
| 58 | 18 | 80 |
| 58 | 18 | 89 |
| 58 | 17 | 88 |
| 58 | 18 | 82 |
| 58 | 19 | 93 |
| 50 | 18 | 89 |
| 50 | 18 | 86 |
| 50 | 19 | 72 |
| 50 | 19 | 79 |
| 50 | 20 | 80 |
| 56 | 20 | 82 |
| 70 | 20 | 91 |

1. Normalize the data
2. Calculate the Covariance Matrix of the Normalized data
3. Determine the Principal Components
4. Determine the Eigen Values and Eigen Vectors of the above Covariance Matrix