### Assignment 12

**Assignment Title:**

1. The covariance matrix of a random vector is given by
2. The eigenvalues of the covariance matrix are the square roots of the singular values of the data matrix.
3. The principal components are the directions of maximum variance in the data.
4. The cumulative variance explained by the first three components.

**Instructions:**

- Submit your solutions to the Assignment Manager by the due date.
- Show all work for full credit.

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#### Table: Covariance Matrix

<table>
<thead>
<tr>
<th>Component</th>
<th>Covariance</th>
<th>Variance Explained</th>
<th>Cumulative Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.5</td>
<td>0.25</td>
<td>0.25</td>
</tr>
<tr>
<td>2</td>
<td>0.3</td>
<td>0.18</td>
<td>0.43</td>
</tr>
<tr>
<td>3</td>
<td>0.4</td>
<td>0.28</td>
<td>0.71</td>
</tr>
</tbody>
</table>

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**Due on:**

10/12/2015 11:59 PM