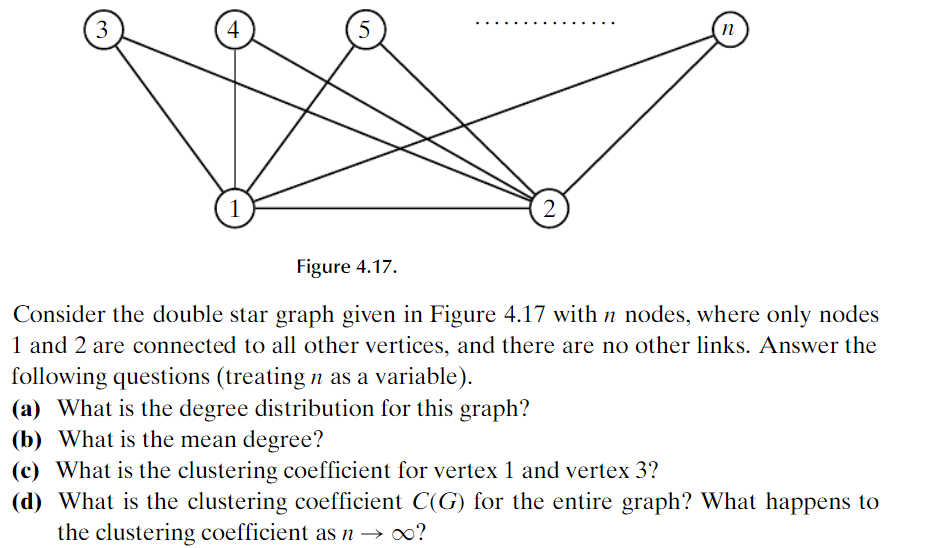
**Data Mining (CSE542)**

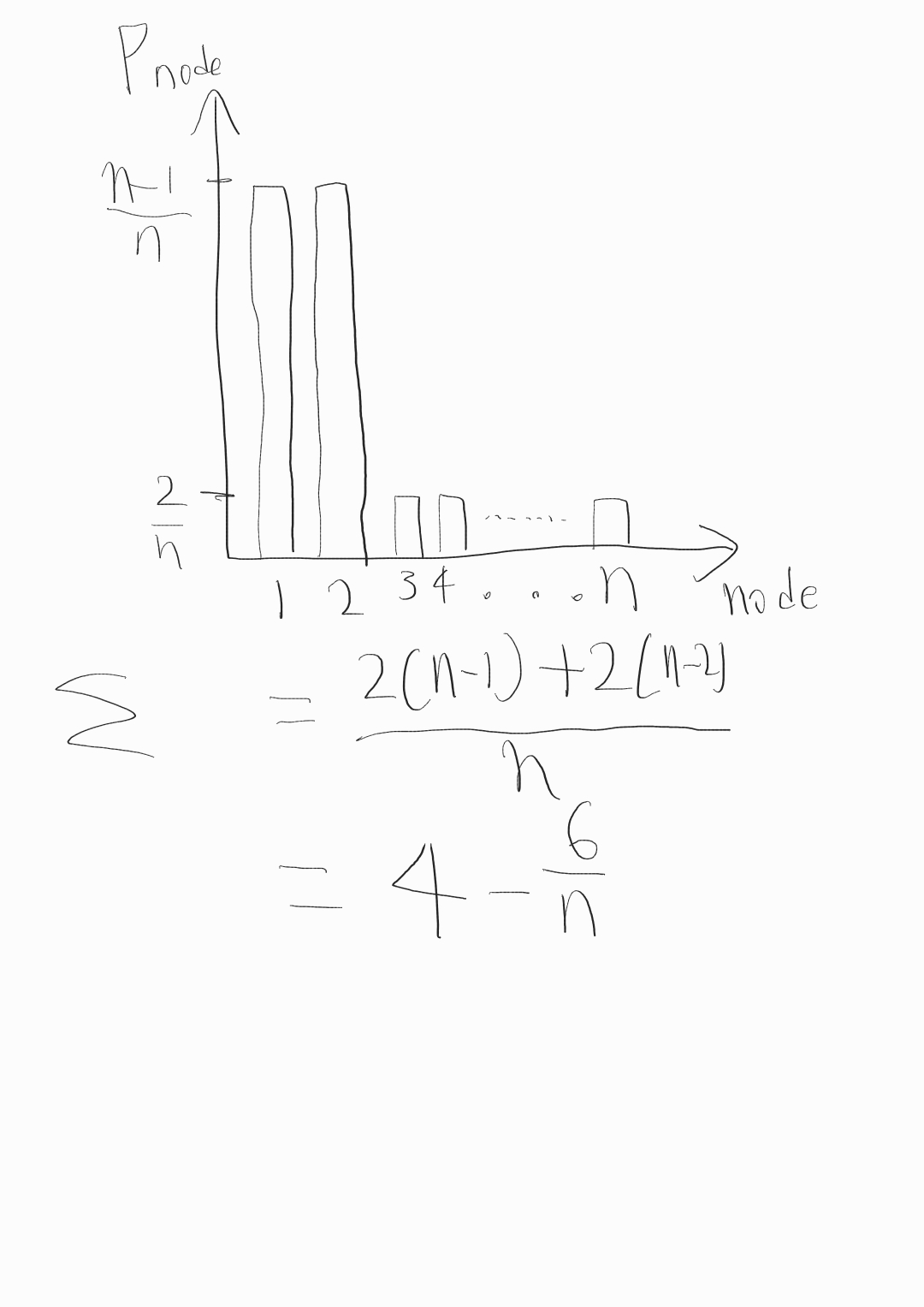
**Homework 03**

**ID: \_\_\_\_ Name: \_\_\_조원석\_\_\_\_\_ Date:\_\_2023-04-03\_\_**

**Task-1**

****

**(a) degree distribution**



|  |  |
| --- | --- |
| **P** | **Pnode** |
| **2** |  |
| **n-1** |  |

**(b) mean degree =**

**(c) clustering coefficient for**

**- vertex 1 : C(1) =**

**- vertex 3 : C(3) = 1**

**(d)**

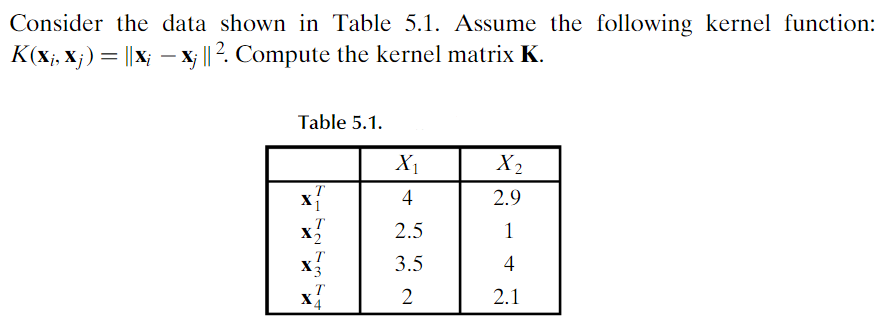
**- clustrering coefficient C(G) for the entire graph**

**C(G) =**

**- clustering coefficient as n -> ∞**

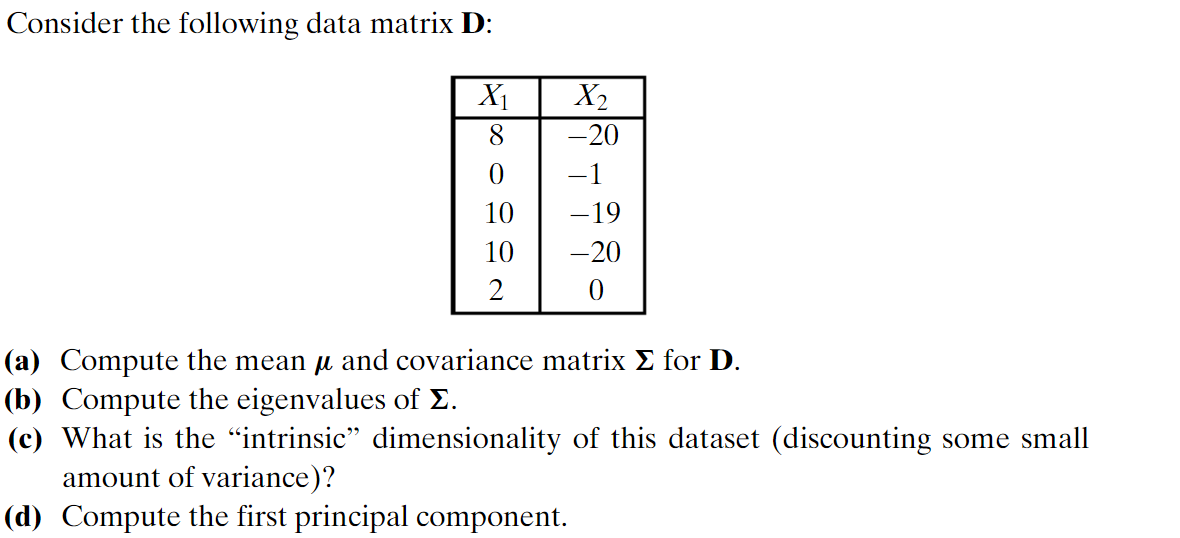
**C(G) ->**

**Task-2**

****

**- Kernel matrix K**

**Task-3:**

****

**(a) Compute the mean µ and convariance matrix ∑ for D**

**µ = [ ] = [6.0, -12.0]**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **X1** | **X2** | **X1^2** | **X2^2** | **X1 × X2** |
| **8- (6.0)=2** | **-20 - (-12.0)=-8** | **4** | **64** | **-16** |
| **0- (6.0)=-6** | **-1- (-12.0)=11** | **36** | **121** | **-66** |
| **10- (6.0)=4** | **-19- (-12.0)=-7** | **16** | **49** | **-28** |
| **10- (6.0)=4** | **-20- (-12.0)=-8** | **16** | **64** | **-32** |
| **2- (6.0)=-4** | **0- (-12.0)=12** | **16** | **144** | **-48** |
| **SUM** | | **88** | **442** | **-190** |
| **SUM / 5** | | **17.6** | **88.4** | **-38** |

**∑ for D =**

**= ( )**

**(b) Compute the eigenvalues of ∑  
 solving eigenvalues by det( ∑ - λI ),**

104.9342 ≒

**(c) What is the “intrinsic” dimensionality of this dataset( discounting some small amount of variance)?**

=> first principal component is 105.

**(d) Compute the first principal component.**

**=> ∑ ui=λiui,** 104.9342

Solving eigenvector)

**,**

**If y = 1, x0.4351**

**) =( )**