**Problem 1**



E-step:

1. Set
2. Calculate

M-step:

1. Initializing**,**  in some way.

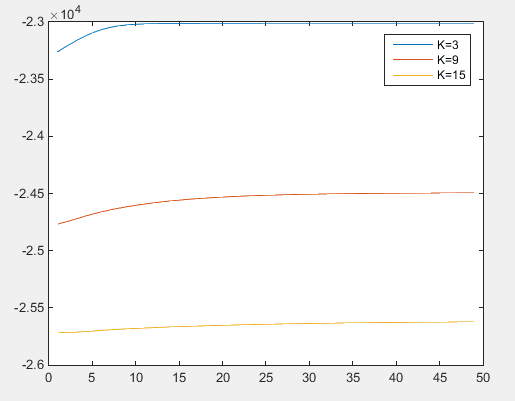
2.For interation t = 1,2, …, T

(a)E-step: for i = 1,2,…,n and k = 1,2,…,K , set:

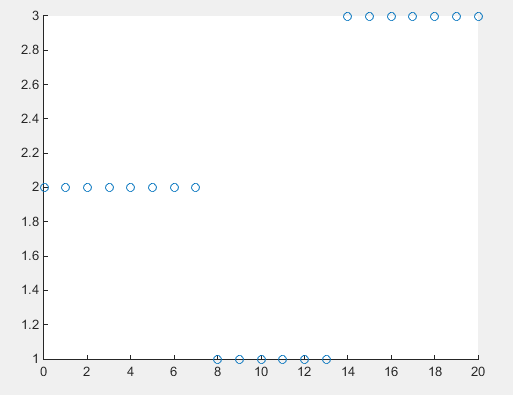
(b)M-step: set:

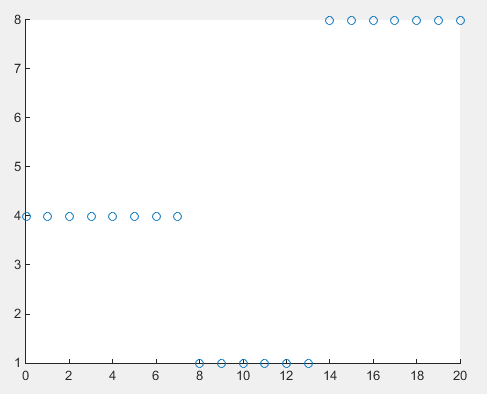
(c)Calculate to assess convergence

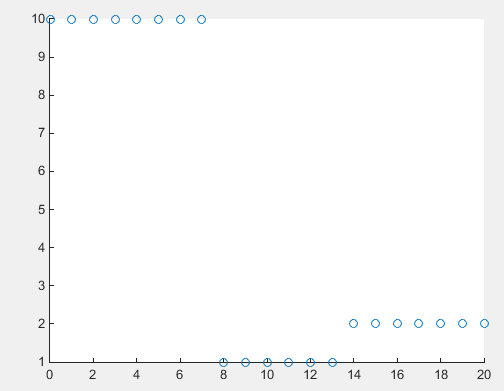
1. Log marginal likehood



1. Use to find most probable clusters for three model







**Problem 2**



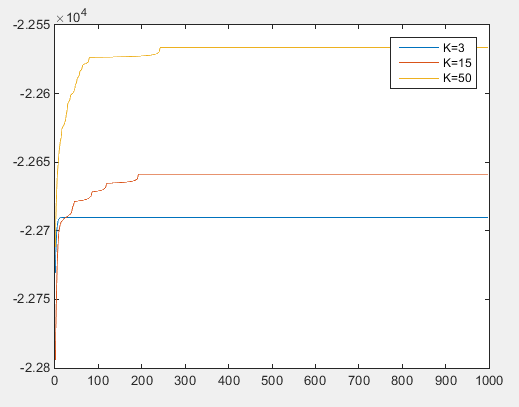
Input: data , number of clusters.

Output: parameters for

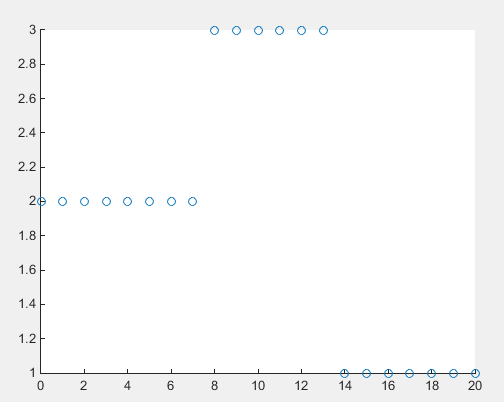
1. Initialize in some way.
2. At interation t:
3. Update by setting:

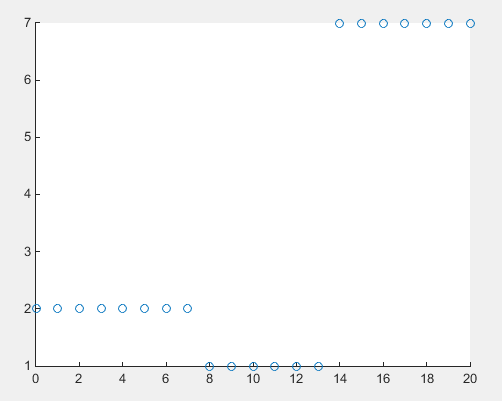
1. Set
2. Update by setting:

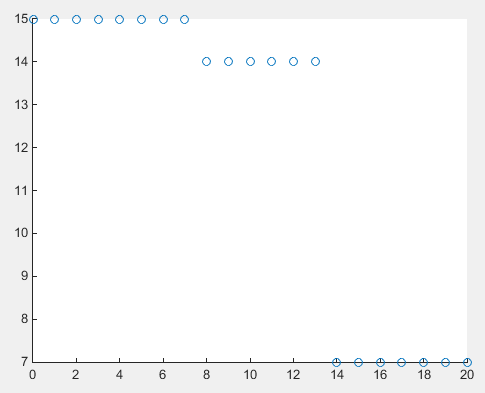
1. Update by setting:
2. Calculate Objective function:
3. Objective function



1. Find most probable clusters







**Problem 3**

**a)**

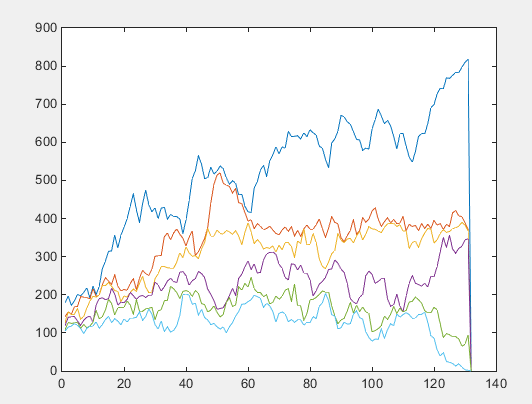
for all j such that

for a new cluster j’

For all cluster

**b)**

Six most probable clusters



**c)**

Total number of clusters

