

# INF554 - Machine Learning & Deep Learning

## Lab 4: SOLUTIONS

### Question 1

One reasonable way to choose the number of clusters is by considering the plot we have created in Task 3 and observing after which number  $k$  of centroids the objective function of the  $K$ -means algorithm is not significantly improved by the addition of further centroids. In the plot we have obtained here this would lead us to choose  $K$  equal to 4 centroids in our  $K$ -means implementation. Choosing the number of centroids on the basis of a plot of the objective function of the  $K$ -means algorithm is often referred to as the “Elbow-method”.

### Question 2

As we have observed in our experiments, the  $K$ -means algorithm is sensitive to its initialisation. Hence, if we initialise several centroids in a cluster then there is a non-negligible chance that we end up fitting several centroids to a single cluster.