**Finding Optimal number of clusters using Elbow method**

To determine the optimal number of clusters using the elbow method, I first calculate the Within-Cluster Sum of Squares (WCSS) for different numbers of clusters. The WCSS measures the sum of squared distances between each data point and the centroid of its cluster, with lower WCSS values indicating tighter clustering. I start by importing necessary libraries such as NumPy, Matplotlib, and KMeans from Scikit-learn. Then, I prepare my data by converting it into an array format if it's in a Data Frame. For a range of cluster numbers (typically from 1 to 10), I fit the KMeans algorithm to my data and record the WCSS for each number of clusters.

Next, I plot the WCSS values on the y-axis against the number of clusters on the x-axis. This plot helps me visualize the point where the WCSS starts to decrease less steeply. This point, known as the "elbow," indicates the optimal number of clusters. Beyond this point, adding more clusters results in only a marginal decrease in WCSS, suggesting that the improvement in clustering quality diminishes.

A graph of a number of clysters

Description automatically generated

Hence, From the Graph plotted, we can get the optimal value of Cluster is 2.