1145-55-504　　　　**Wako Tasisa Bungula*** (`wako-bungula@uiowa.edu`), 14 MacLean Hall, Iowa City, IA 52246.
Filtration and Stability Of Mapper graphs for Point Cloud Data.

The instability of TDA Mapper has been studied at least for topological space data and for PL functions. By extending Mapper to Multiscale Mapper and defining an ϵ-interleaving, stability theorems were stated by Tamal Dey and et al. However, for point cloud data, neither ϵ-interleaving nor stability have not been studied mainly because of the issues that arise with clustering algorithms. For example, hierarchical clustering algorithms use dendrograms (and cutting) to determine the clusters, and the issue is where to cut the dendrogram. The number of clusters may be very different if we cut at a height h_0 and $h_0 + \delta$. KMeans clustering has two issues. First, the number of clusters has to be specified by the user which could lead to misleading result about the actual clusters. Second, KMeans clustering is not stable. That is, if KMeans is run twice, the result is different. DBSCAN clustering takes two parameters to define a cluster, and these parameters are specified by the user. I will be talking about these clustering methods in detail and how ϵ-interleaving could be defined for point cloud data that will lead to stability of mapper graph. (Received September 07, 2018)