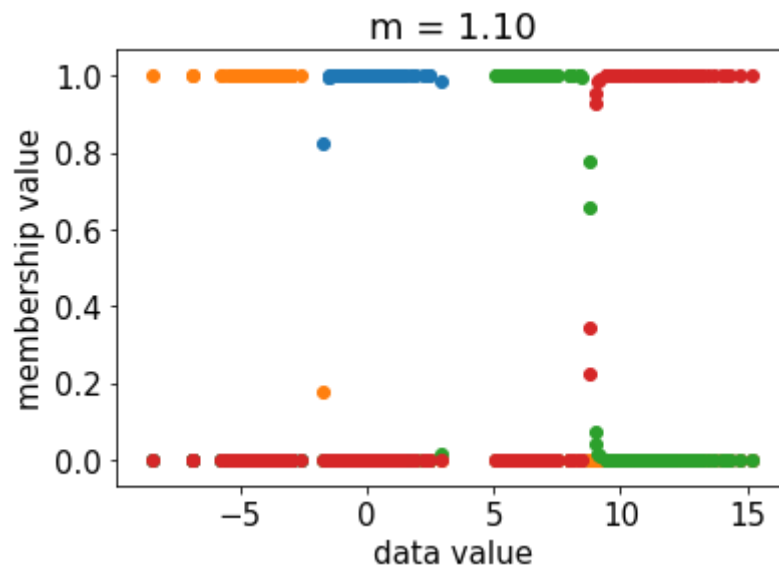


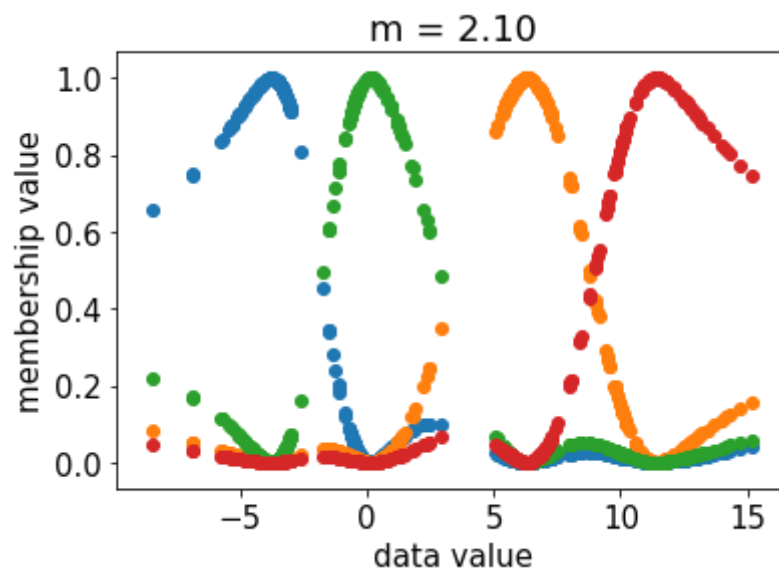
We consider minimization problem in which we reconstruct (degranulate) original x when using the prototypes and the membership grades.

Membership function imposed by the partition matrix U :

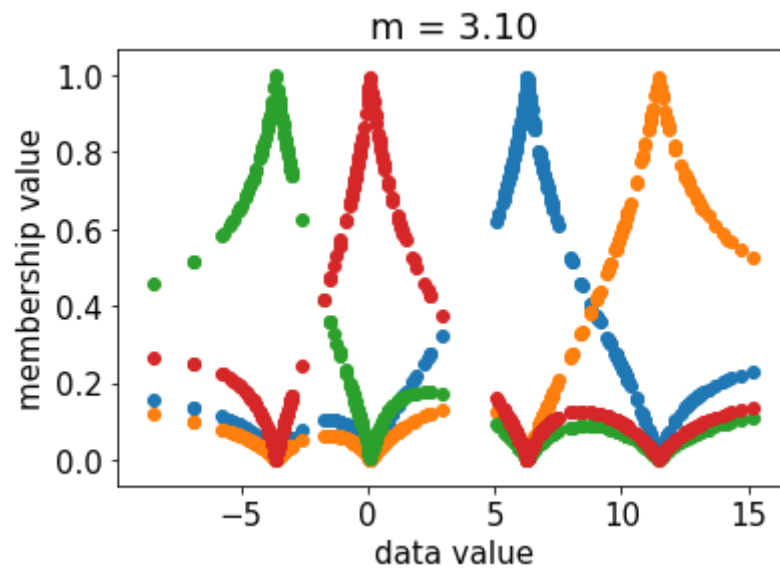
$m = 1.1$, $C = 4$ number of clusters.



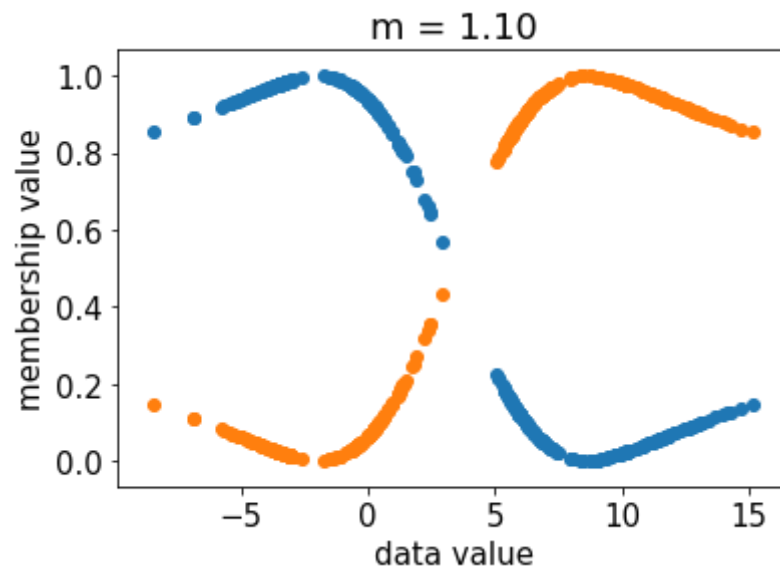
$m = 2.1$, $C = 4$ number of clusters.



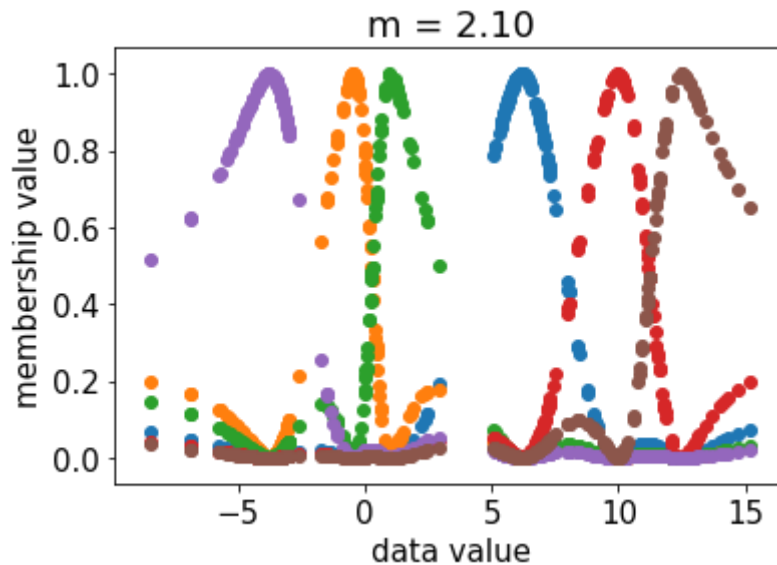
$m = 3.1$, $C = 4$ number of clusters.



$m = 2.1$, $C = 2$ number of clusters.



$m = 2.1$, $C = 6$ number of clusters.



Fuzzification coefficient determine geometry of shape of membership functions. Lower values of m (that are closer to 1) yield membership functions that start resembling characteristic functions of sets; most of the membership values become localized around 1 or 0. The increase in the fuzzification coefficient ($m > 3$) produces spiky membership functions with the membership grades equal to 1 at the prototypes and a fast decline of the values when moving away from the prototypes.

By changing the number of clusters we can increase specificity and decrease consistency characteristics of clusters. Optimal value depends on the task. For our problem 4 clusters is good choice, data spread evenly.