$$A^{0.3} = \{-1,0,3\}$$

$$A^{\overline{0.6}} = \{1\}$$

<u>Hw</u>:

Give an example to prove the following relationship

$If\ \alpha_1 < \alpha_2$ then $A^{\alpha 1} \subseteq A^{\alpha 2}$ or $A^{\alpha 2} \subseteq A^{\alpha 1}$

**Features of Membership Function**

The feature of the membership function is defined by three properties. They are:

(1) Core

If the region of universe is characterized by full membership in the fuzzy set A, then this gives the core of the membership function of fuzzy at A. and denoted $A^1$

$$A^1 = \{ s : s \in S : \mu_A(s) = 1\}$$

(2) Support

The support of a membership function for fuzzy set A, If the region of universe is characterized by nonzero membership in the fuzzy set A, The support has the elements whose membership is greater than 0.

$$\text{supp}(A) = A^{0+} = \{ s : s \in S : \mu_A(s) > 0\}$$

(3) Boundary

Dr. neaam hazem

Characteristics of fuzzy set

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This chapter discusses on the features and the various methods of arriving membership functions.

**1- alfa Cuts for Fuzzy Sets** $\alpha - cut$

If A is a fuzzy set, then the alfa cut set can be denoted by $A^{\alpha}$ ,where $\alpha$ ranges between 0 and 1 $\alpha \in [0,1]$, The set $A^{\alpha}$ is going to be a crisp set, This crisp set is called the alfa- cut set of the fuzzy set A , where:

$$\alpha - cut = A^{\alpha} = \{ s: s \in S : \mu_A(s) \geq \alpha, \alpha \in [0,1]\}$$

2- **Strong** $\boldsymbol{\alpha - cut}$

If A is a fuzzy set, then , the strong alfa cut set can be denoted by $A^{\overline{\alpha}}$ ,where $\alpha$ ranges between 0 and 1 $\alpha \in [0,1]$, The set $A^{\overline{\alpha}}$ is going to be a crisp set, This crisp set is called the strong alfa- cut set of the fuzzy set A , where:

$$A^{\overline{\alpha}} = \{ s: s \in S : \mu_A(s) > \alpha, \alpha \in [0,1]\}$$

Ex:

S={-2,-1,0,1,2,3,4} and A represents the Fuzzy set of S, where

$$A = \{\frac{0.0}{-2} + \frac{0.3}{-1} + \frac{0.6}{0} + \frac{1.0}{1} + \frac{0.6}{2} + \frac{0.3}{3} + \frac{0.0}{4}\}$$

Find $A^{0.3}$ and $A^{\overline{0.6}}$ $\alpha \in [0,1]$