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FUZZY MATHEMATICS

* studies on fuzzy sets versus crisp sets. *

difference between crisp set and fuzzy set.

crisp set :->

countability and finiteness are identical properties which are the collection objects of crisp set. 'X' is a crisp set defined as the group of elements present over the universal set. i.e. U. In this case a random element is present that may be a part of X or not that means two ways are possible to define the set. these are first element would become from set X, or it does not

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Fuzzy set:-

The integration of the elements having a changing degree of membership in the set is called as fuzzy set. The word "fuzzy" indicates vagueness, on the other hand, we can say that the replacement among various degree of the membership implies that the vague and ambiguity of the fuzzy set. Hence, the measurement of the membership of the elements from the universe in the set against a function for detecting the uncertainty and ambiguity.

SE NO	crisp set	Fuzzy set
1	crisp set defines the value is either 0 or 1.	Fuzzy set defines the value between 0 and 1 including both 0 and 1.
2.	it is also called a classical set.	It specifies the degree to which something is true
3.	It shows Full membership.	It shows partial membership.
4	crisp set application used for digital design.	fuzzy set used in the fuzzy controller.
5	It is bi-valued function logic	It is infinite valued function logic.

conclusion -

The fuzzy set theory is intended to introduce the imprecision and vagueness in order to attempt to model the human brain in artificial intelligence and significance of such theory is increasing day by day in the field of expert systems. However, the crisp set theory was very effective as the initial concept to model the digital and expert system working on binary logic.

Entropy:-

A measure of fuzziness for fuzzy sets of universe U should fulfill the following conditions for all $x \in U$:

1] $d(A) = 0$ if A is a crisp set $\mu_A(x) \in \{0, 1\}$.

2] $d(A)$ has a unique maximum iff $\forall x \in U : \mu_A(x) = 0.5$

3] $\mu_A \leq \mu_B \iff$
 $\mu_A \leq \mu_B \leq 0.5$
 $\mu_A \geq \mu_B \geq 0.5$

which means that B is "crisper" than A .

1. $d(\neg A) = d(A)$

In this case $d(A)$ is called the entropy of the fuzzy set A .

References:-

① Dubois and H. Prade (1988) Fuzzy sets and systems, academic press, New York.