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def: fuzzy set $\tilde{A} \equiv \{(x, m_{\tilde{A}}(x)) \mid x \in X\}$

where X is domain of set $\tilde{A}$
x is any element of domain
$m_{\tilde{A}}(x)$ is membership of x in $\tilde{A}$

$$0 \le m_{\tilde{A}}(x) \le 1$$

def: fuzzy set $\tilde{A}$ is "normal" $\equiv \sup\limits_{x \in X} m_{\tilde{A}}(x) = 1$

where sup is supremum

note: sup is the same as "least upper bound." In most practical situations we can use "max" in place of "sup."

comment: The idea of a "normal" set is that we have at least one element that is definitely in the set. This element is like a zealot who will never change their mind. There may be many zealots in ~~the~~ a group, and thus there may be more than one x value for which $m_{\tilde{A}}(x) = 1$.

note: Membership functions in fuzzy logic have a maximum value of 1 for some x. Thus, our membership functions are all normal.

def: $S(\tilde{A})$ is the support of set $\tilde{A} \equiv S(A)$ is the set of all $x \in X$ (domain of $\tilde{A}$) such that $m_{\tilde{A}}(x) > 0$.

comment: $S(\tilde{A})$ is the set of x having at least some membership in $\tilde{A}$. We exclude those x's having zero membership.