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def: membership function of $\tilde{C} = \tilde{A}$ union $\tilde{B}$ $\equiv$

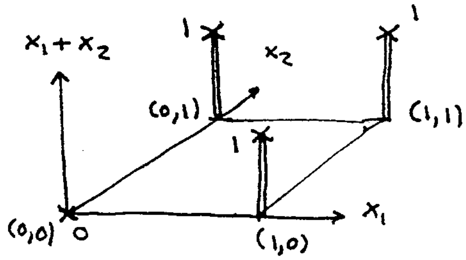
$$m_{\tilde{C}}(x) = \max\left(m_{\tilde{A}}(x),\ m_{\tilde{B}}(x)\right)$$

notn: the following are equivalent

$$\tilde{C} = \tilde{A} \text{ union } \tilde{B}$$
$$\tilde{C} = \tilde{A} \cup \tilde{B}$$
$$\tilde{C} = \tilde{A} \text{ fuzzy OR } \tilde{B}$$
$$\tilde{C} = \tilde{A} \tilde{\vee} \tilde{B}$$
$$\tilde{C} = \tilde{A} + \tilde{B}$$

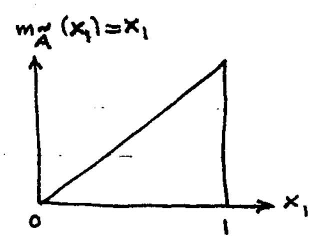
ex: The fuzzy OR extends the notion of OR found in Boolean algebra.

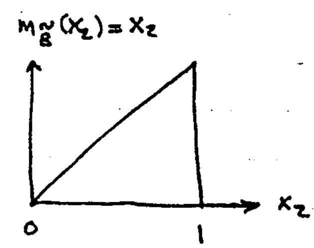
digital OR:
$x_1 = 0$ or 1
$x_2 = 0$ or 1
$x_1 + x_2 = 0$ or 1

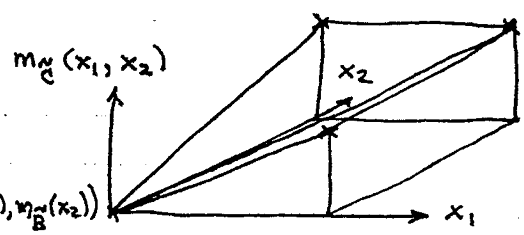


x_1	x_2	$x_1 + x_2$
0	0	0
1	0	1
0	1	1
1	1	1

fuzzy OR:
$x_1 \in [0,1]$
$x_2 \in [0,1]$
$m_{\tilde{A}}(x_1) \in [0,1]$
$m_{\tilde{B}}(x_2) \in [0,1]$
$m_{\tilde{C}}(x_1, x_2) \in [0,1]$

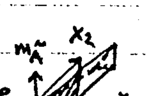






$$m_{\tilde{C}}(x_1, x_2) = \max\left(m_{\tilde{A}}(x_1), m_{\tilde{B}}(x_2)\right)$$
$$= \max(x_1, x_2)$$

we get the digital OR plus values in between.

note: We abused notation slightly. We should say $m_{\tilde{A}}(x_1, x_2) = x_1$ is wedge  etc.