

Solution to Problem 23

Task. For a membership function $\mu(x) = 1 - |x|$, what are the α -cuts corresponding to $\alpha = 0.6$? to $\alpha = 0.4$?

Solution. By definition, the α -cut is the set of all the values x for which $\mu(x) \geq \alpha$.

For $\alpha = 0.6$, this means $1 - |x| \geq 0.6$, i.e., equivalently, $|x| \leq 1 - 0.6 = 0.4$. This inequality is equivalent to $-0.4 \leq x \leq 0.4$, so the corresponding α -cut is the interval $[-0.4, 0.4]$.

Similarly, to $\alpha = 0.4$, we get $1 - |x| \geq 0.4$, i.e., equivalently, $|x| \leq 1 - 0.4 = 0.6$. This inequality is equivalent to $-0.6 \leq x \leq 0.6$, so the corresponding α -cut is the interval $[-0.6, 0.6]$.