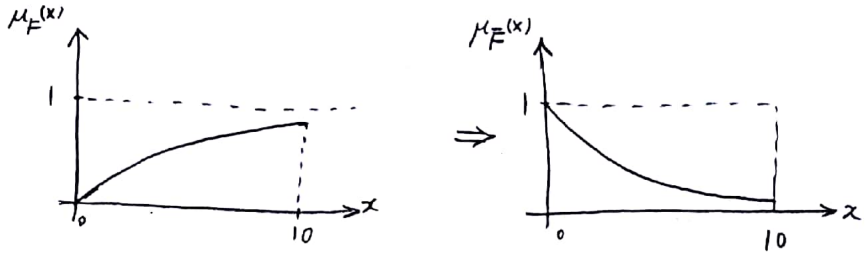
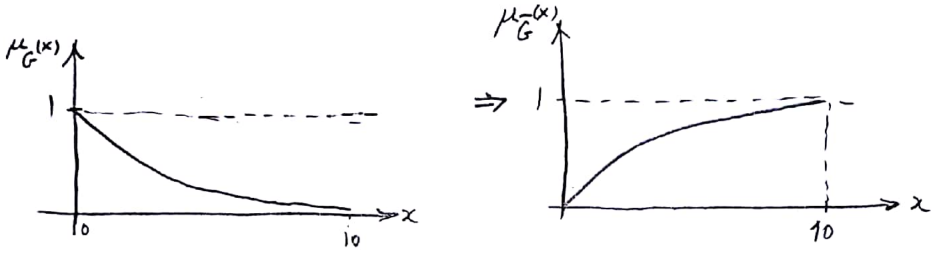
۹۸۲۱۰۱۸۴ ایمان شریفی — تمرین سری اول کنترل فازی

2.3.a)

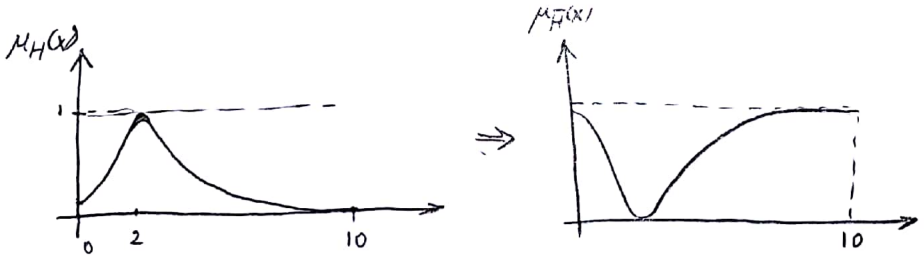
$$\mu_{\bar{F}}(x) = 1 - \mu_F(x) = 1 - \frac{x}{x+2} = \frac{2}{x+2}$$



$$\mu_{\bar{G}}(x) = 1 - \mu_{\bar{G}}(x) = 1 - 2^{-x}$$



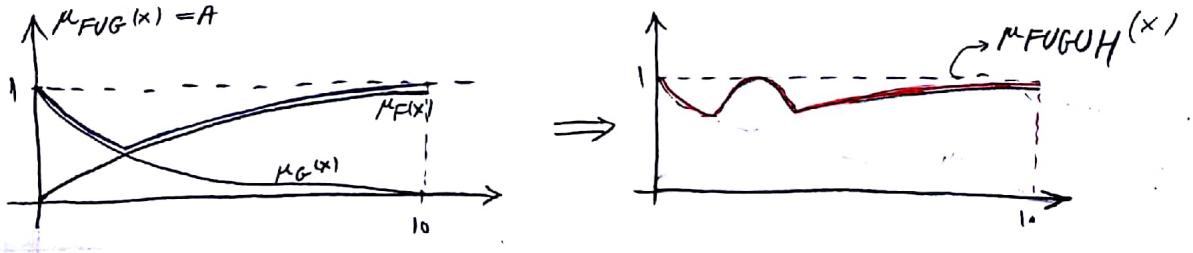
$$\mu_H(x) = \frac{1}{1+10(x-2)^2} \Rightarrow \mu_{\bar{H}}(x) = 1 - \frac{1}{1+10(x-2)^2}$$



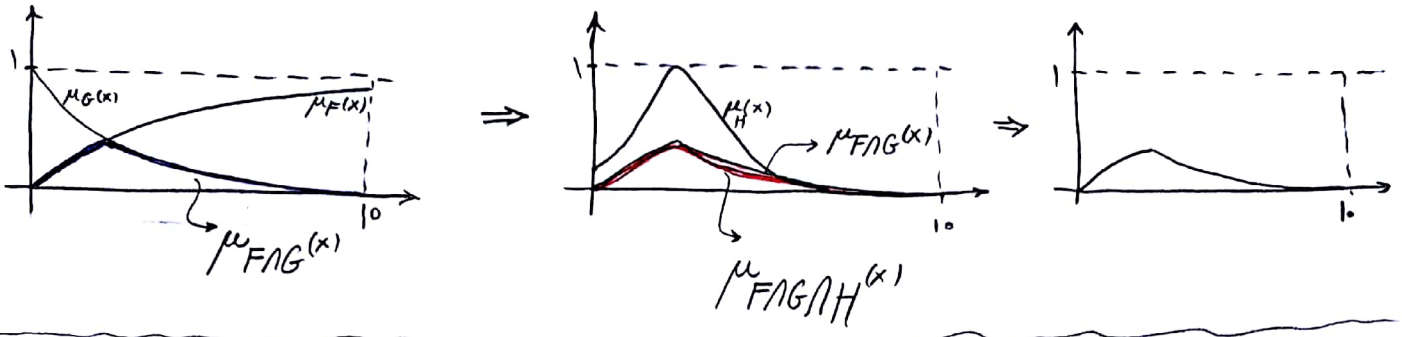
2.3.d)

$$\mu_{(FUGUH)}(x) = \max\left[\overbrace{\max\left[\mu_F(x), \mu_G(x)\right]}^{A}, \mu_H(x)\right]$$

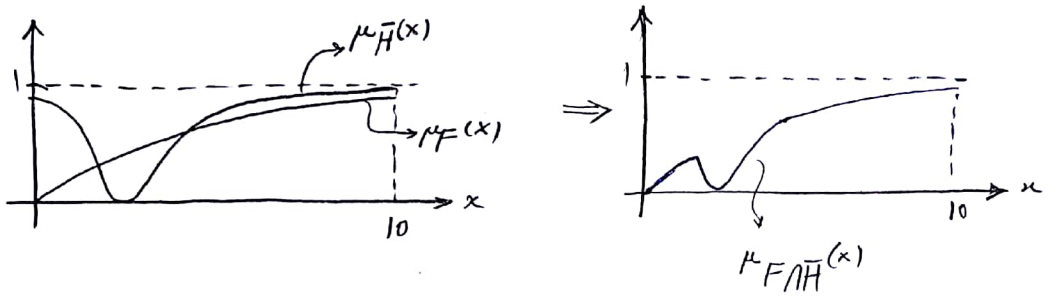
$$A = \max\left[\mu_F(x), \mu_G(x)\right]$$



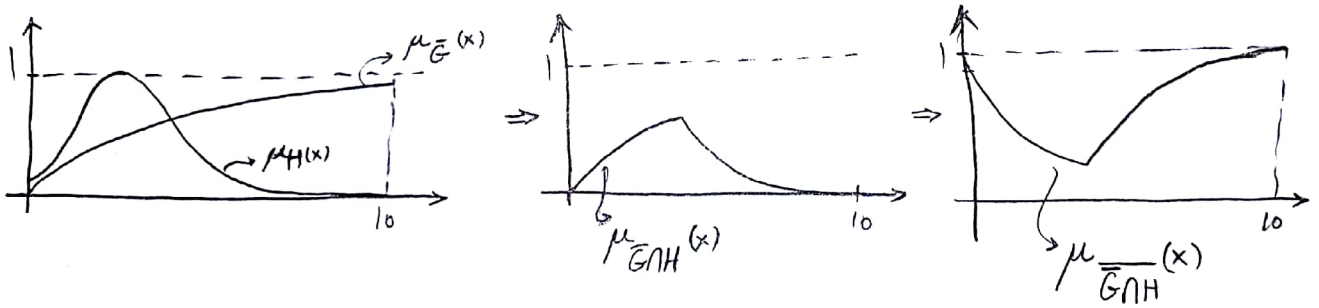
$$\mu_{F \wedge G \wedge H} = \min\left[\min\left[\mu_F(x), \mu_G(x)\right], \mu_H(x)\right]$$



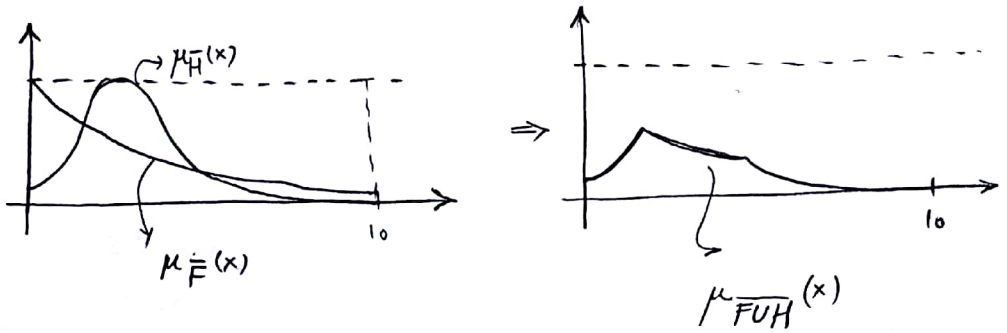
2.3.e) $\mu_{F \wedge \bar{H}}(x) = \min\left[\mu_F(x), 1 - \mu_H(x)\right]$



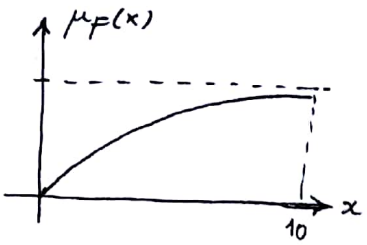
$$\mu_{\overline{\bar{G} \wedge H}}(x) = 1 - \min\left[\mu_{\bar{G}}(x), \mu_H(x)\right]$$



$$\mu_{\overline{F \cup H}}(x) = \mu_{\bar{F} \wedge \bar{H}}(x) = \min\left[\mu_{\bar{F}}(x), \mu_{\bar{H}}(x)\right] = \min\left[1 - \mu_F(x), 1 - \mu_H(x)\right]$$



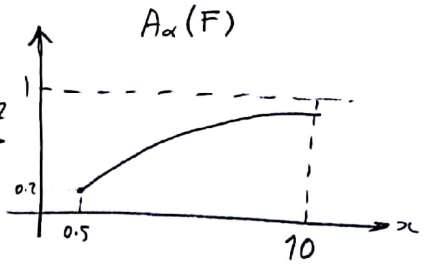
2.4.a) $A_\alpha = \{x \in U \mid \mu_A(x) \geq \alpha\}$

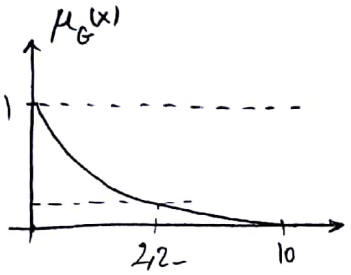


$\mu_F(x) = \frac{x}{x+2} \geq 0.2$

$\Rightarrow x \geq 0.5$

$\alpha = 0.2 \Rightarrow$

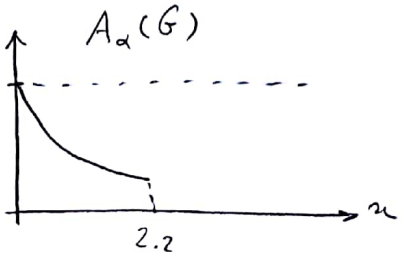


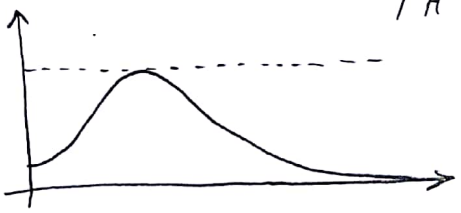


$\mu_G(x) = 2^{-x} \geq 0.2$

$x \leq 2,2\ldots$

$\alpha = 0.2 \Rightarrow$

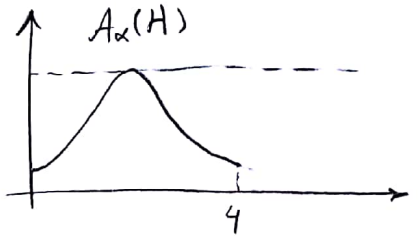




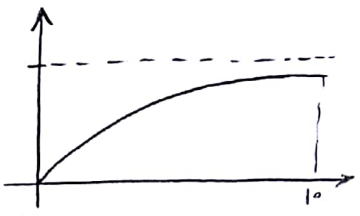
$\mu_H(x) = \frac{1}{1+10(x-2)^2} \geq 0.2$

$x \leq 4$

$\alpha = 0.2 \Rightarrow$



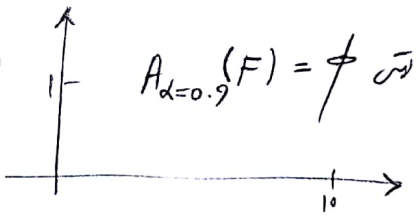
2.4.c) $\alpha = 0.9$

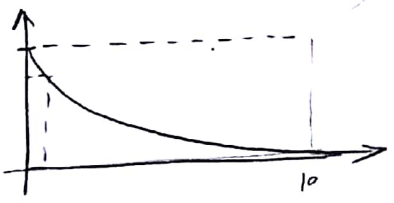


$\mu_F = \frac{x}{x+2} \geq 0.9$

$x \geq 18$

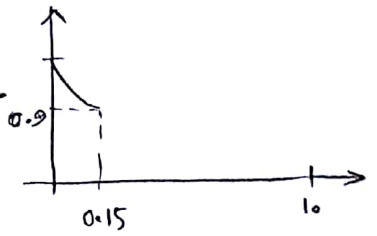
$\alpha = 0.9 \Rightarrow$

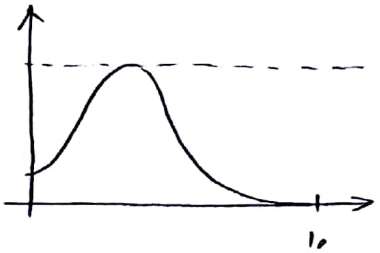




$\mu_G(x) = 2^{-x} \geq 0.9$

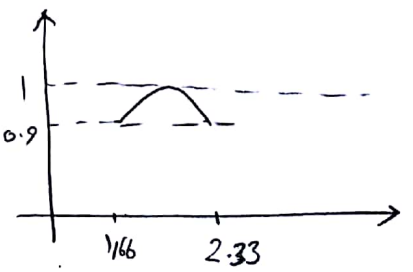
$x \leq 0.15$





$\mu_H(x) = \frac{1}{1+10(x-2)^2} \geq 0.9$

$1.667 \leq x \leq 2.333$



2.5) $\mu_A(x_1, x_2) = \exp\left(-(x_1^2 + x_2^2)\right)$

if $\mu_{A(x)} = \mu_A(x_1, x_2, \dots, x_n)$ And $H = \left\{ x \in R^n \,\middle/\, x_1 = 0 \right\}$

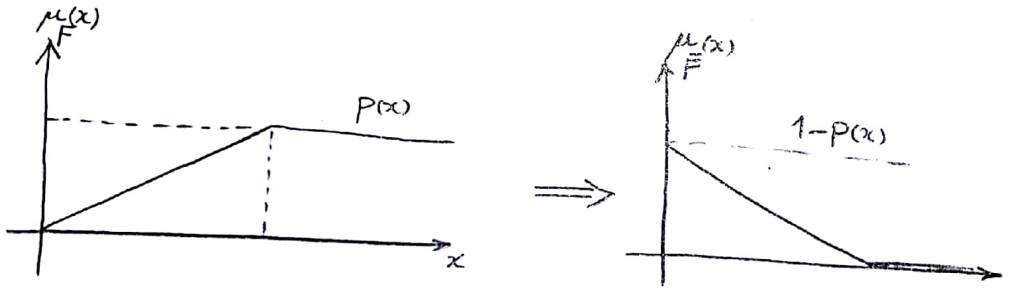
A_H defined in R^{n-1} by $\mu_{A_H}(x_2, \dots, x_n) = \sup_{x_1 \in R} \mu_A(x_1, \dots, x_n)$ → projection

$\mu_{A_{H_1}}(x_2) = \sup_{x_1 \in [-1,1]} \mu_A(x_1, x_2) = e^{-x_2^2}$ ($x_1 = 0$)

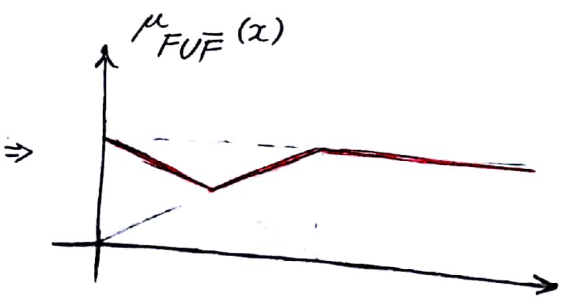
$\mu_{A_{H_2}}(x_1) = \sup_{x_2 [-3,3]} \mu_A(x_1, x_2) = e^{-x_1^2}$ ($x_2 = 0$)

denotes the maximum value of the function $\mu_A(x_1, x_2 \dots x_n)$ when x_1 takes values in R.

2.6) Show that the law of excluded middle, $F \cup \bar{F} = U$ is not true, if F is a Fuzzy set.



مثال نقض:



* بیان کردیم که درجه عضویت $\mu_{F \cup \bar{F}}(x)$ همیشه برابر یک یا True نیست بنابراین حکم درست است.