21070006054 - Arda Harman Signature:

1.) $|A| = 0.3 + 0 + 0.5 + 0.9 + 1 = 2.7$

$|B| = 0.8 + 1 + 0 + 0.2 + 0.1 = 2.1$

$A \cup B = \frac{0.8}{1} + \frac{1}{2} + \frac{0.5}{3} + \frac{0.9}{4} + \frac{1}{5}$

$A \cap B = \frac{0.3}{1} + \frac{0}{2} + \frac{0}{3} + \frac{0.2}{4} + \frac{0.1}{5}$

$A - B = \frac{0.2}{1} + \frac{0}{1} + \frac{0.5}{3} + \frac{0.8}{4} + \frac{0.9}{5}$

$A^c = \frac{0.7}{1} + \frac{1}{2} + \frac{0.5}{3} + \frac{0.1}{4} + \frac{0}{5}$

$B^c = \frac{0.2}{1} + \frac{0}{2} + \frac{1}{3} + \frac{0.8}{4} + \frac{0.9}{5}$

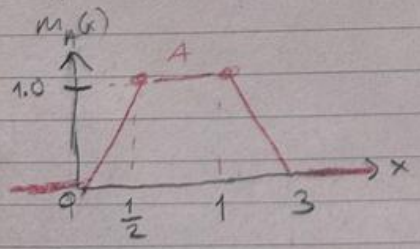
$A \oplus B = \frac{1}{1} + \frac{1}{1} + \frac{0.5}{3} + \frac{1}{4} + \frac{1}{5}$

$A \ominus B = \frac{0}{1} + \frac{0}{2} + \frac{0.5}{3} + \frac{0.7}{4} + \frac{0.9}{5}$

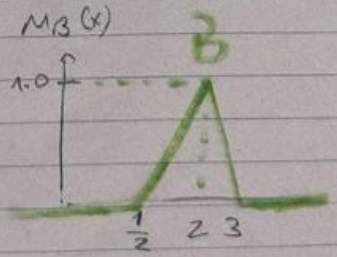
$B_{0.3} = \frac{0.8}{1} + \frac{1}{2}$

2.) Membership of A, B and C on the same graph

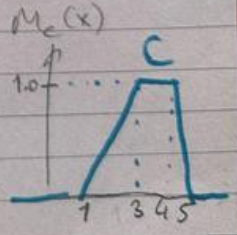
Graph of A



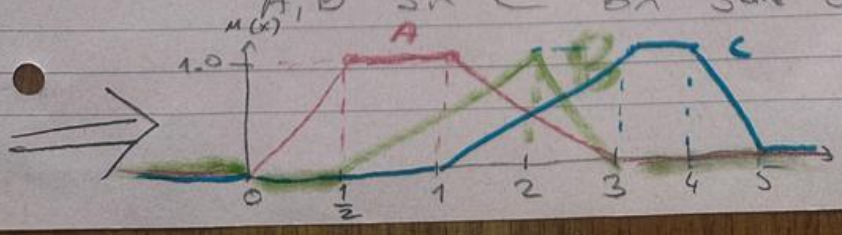
Graph of B



Graph of C

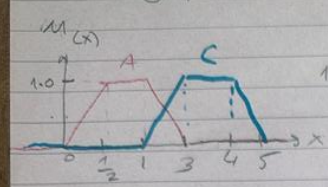


A, B and C on same Graph

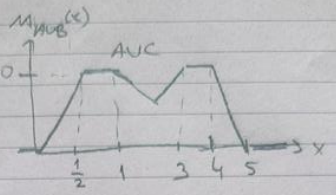


• Member ship function graph of (AUC) ∩ B

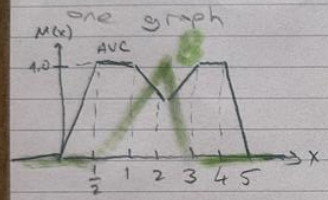
Graph of A and C in one graph



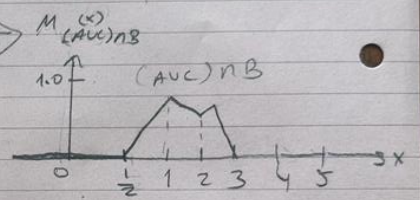
Graph of AUC



Graph of (AUC) and B in one graph

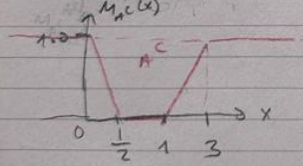


Graph of (AUC) ∩ B

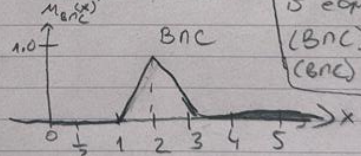


• Member ship function graph of (B ∩ C) − A

Graph of A^c

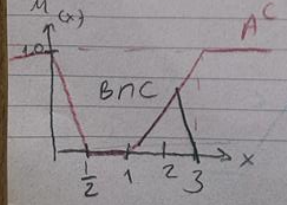


Graph of B ∩ C

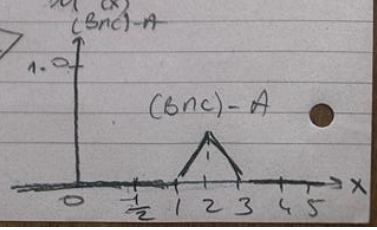


since, (B ∩ C) − A is equal to (B ∩ C) ∩ A^c, I used (B ∩ C) and A^c

Graph of (B ∩ C) and A^c in one graph

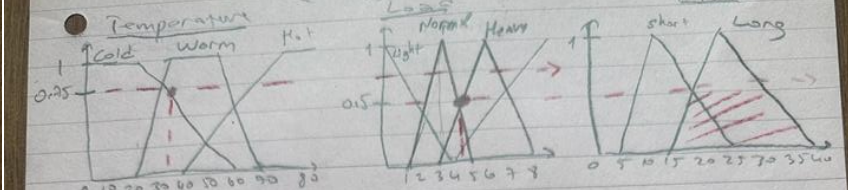


Graph of (B ∩ C) − A



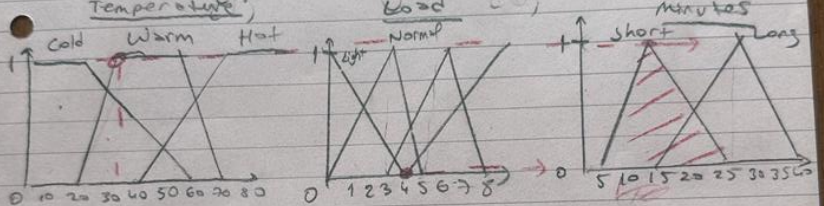
3) R_1: IF Temperature is Cold AND Load is Normal THEN minutes is Short

(0.75) ∩ (0.5) = 0.5



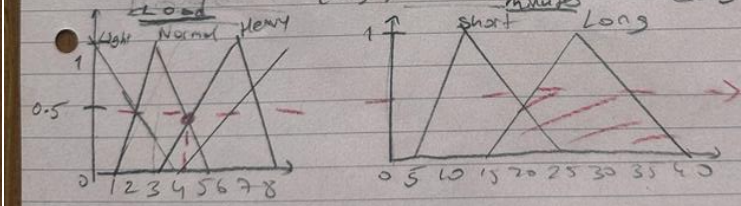
R_2: IF temperature is Warm OR Load is Light, THEN Minutes is Short

(1) ∪ (0) = 1



R_3: IF Load is Heavy THEN Minutes is Long

(0.5) = 0.5



Area of R_1's Trapezoid = A_1 = $\frac{(20+32.5)(0.5)}{2}$ = 13.125

Area of R_2's Triangle = A_2 = $\frac{(20.1)}{2}$ = 10

Area of R_3's Trapezoid = A_3 = $\frac{(20+32)(0.5)}{2}$ = 13.125

• Centers of A_1, A_2 and A_3:

x_1 = $\frac{15+40}{2}$ = 27.5

x_2 = $\frac{5+25}{2}$ = 15

x_3 = $\frac{15+40}{2}$ = 27.5

Output:

$\Rightarrow \frac{(x_1 \cdot A_1 + x_2 \cdot A_2 + x_3 \cdot A_3)}{(A_1 + A_2 + A_3)}$

= $\frac{(27.5)(13.125) + (15)(10) + (27.5)(13.125)}{13.125 + 10 + 13.125}$ = 24.05