max-product composition	1
max-product composition of R(x, Y) and S(Y, Z) defined as	is
T(x,z) = R • S	(·
R(x, Y) · S(Y, Z) = max [UR (x, Y) · Us (Y, Z)]	-
> V [UR (x, y), Us (y, z)]	
+ α∈×, z∈Z·	
Z, Z ₂ Z ₃	-
-1. T = x1 0.6 0.3 0.21	
×2 6-72 0.36 0.63	
U, (x, ,z,) = max & [UR (x, Y,) · U(Y, ,z,)],	
[M _R (x ₁ , y ₂) · M ₃ (y ₂ , z ₁)]?	
= max \$ 0.6, 0.24 }	!
= 0.6	
My (2,72) = max 30.3,0.123 =0.3	
W. (2, 12)	
11 (10-1
U+ (x, ,73) = max { 0.18, 0.213 = 0.21	7-5
	<u> </u>
Ut (2, 7,) = max {0.2, 0.72} = 0.72	· [-
	- 3
My (x, 7,) = max {0.10, 0.36} = 0.36	
My (x2, 75) = max {0.06, 0.63} = 0.63	
	+

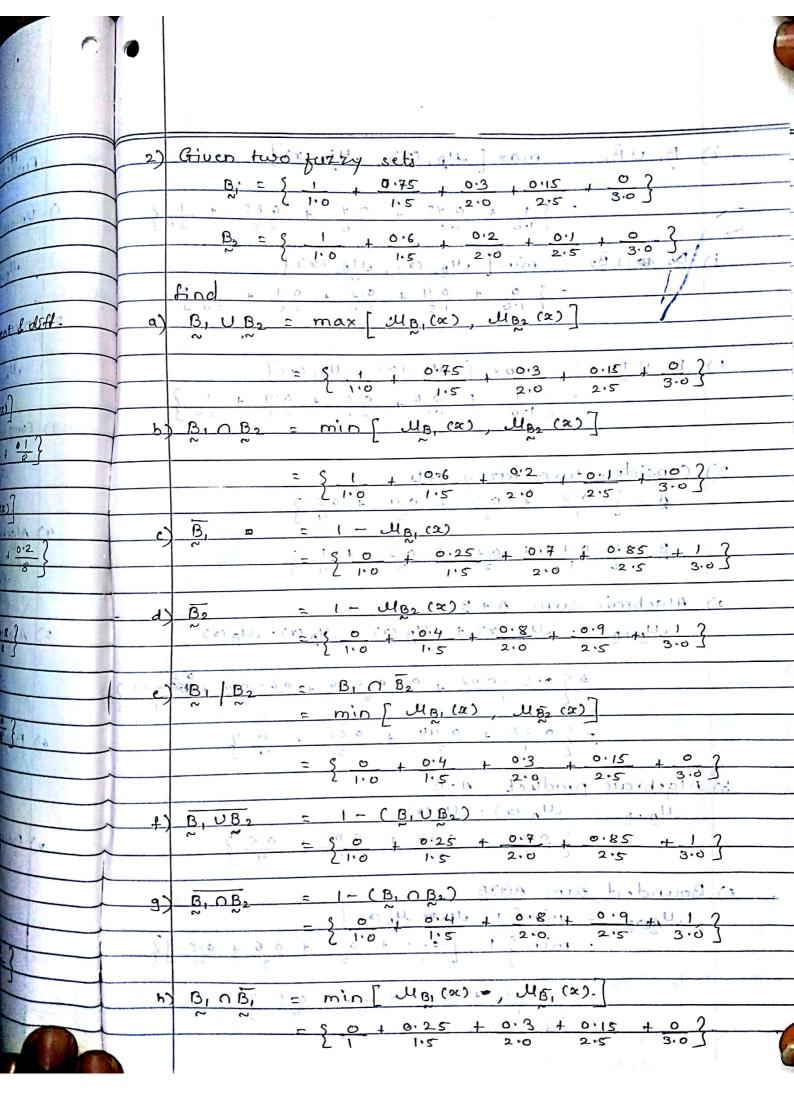
```
.. T = ROS. =
                   0.8 0.4 0.7.
  U7 (x1,71) = max & min[ u(x1, 41), us (4,71)],
                    min[ UB (x, 1/2), M3 (42, 21)]
              max \ 0:6, 0:33.
Un (x1, 72) = max { min [ Up (1x1, 4,), Us ($9,, 72)]
                     min[ Mg (x, , Y2), Mg (42, 7,)]}
           = max 9 0.5, 0.3}
U, (x, , 73) = max 5 min [ elle (x, y,), le (24, 73)]
               min [ Mg (x, y, ), Ms. (x, 23)]?
           = max } 0.3, 0.3}
U, (x, , Z,) = max } [ min [ Up(x, y,), Us (y,, Z,)],
                   min[ , 4g (x2, y2), 1/2 (y2, 7, )]}
```

7	
#	and (BY= 3 0:4:14 1019. 3
	The cartesian product performed over fuzzy sets
	A and B results in relation R
	$R = A \times B = *, 0.3 0.3 \text{up}(x_1, y_1) = \min(\text{ut}(x_1), \text{up}(x_1, y_2) = \min(\text{ut}(x_1), \text{up}(x_2), \text{up}(x_2$
	P(15, 9). (1 (142) 0; 4, 70.7 (1) 3 x 0 m = (1) (2)
	$R = A \times B = x_1 = 0.3 = 0.3 $ $C_{1} \times C_{2} = 0.4 =$
	\$60 50 5 WW.
2.	Two fuzzy relations are given by
	7, 72
	Tour 3: 0.6 .0.3 1 . Landais = 10.1 . 0.5 .0.3
	Rie 3: 0.6 .0.3 and is = 1 . 1 . 0.5 .0.3 2 . 22 . 23 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2 . 2
	\$5.0 8.0 i vom
II.	
	Obtain fuzzy relation T as a composition between
7	Tasy relations.
	The composition between two given fuzzy
<u> </u>	relations is performed in two ways
- 1	a) max-min composition
	. B) maxil product composition
-	S(Cos, r) , N, (x, x) , N, (x) , No fair
	max-min composition of R(X,Y) and S(Y,Z)
	is defined as,
	R(x, y) 0 S(y, Z) = max s min [Up (x, y), Ws (y, z)]
	R(x, y) 10 S(y, z) = max s min [UR(x, y), uls (x, z)]}
	= V [MR (2,4) N M2 (4,2)], +x ex
	YeY L ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~ ~

d)	Bounded difference JOR
	101 M 10 M 10 10 M 10 M
	M _{TOR} (x) = max [0, μ _T (x) - μ _B (x)]
	2.0 + 20 + 10 + 10 (0 ×0m ·
	$= \max \left\{ 0, \left[0 + 0.1 + 0.4 + 0.6 + 0.5 +$
	5 200 6 20 20 10 12 10 2 - 3 7
	= 5 0 + 0.1 + 0.4 + 0.6 + 0.5 + 0.5 }
	= \$ 0 + 0.1 + 0.4 + 0.6 + 0.5 + 0.5 }
	stransistar and a raister asi
	- 2
	81 + 60 + 30 + 60 + 00 + 0 3 . The Fo
	5 20 + 10 + 20 + 30 + 10 + 0 (glu)
	a) Algebraic sum de A + B
nally is	ا بلا و دواول و دارو و دا و دارو الله الا و داو الله الله
	8 5.1 + 8.1 + 0.1 + 0.1 + 5 0 + 0] = 1
F	50 190 190 120 1 200 10 -
	1 200 t Hb 0 t 48 a 1 bt 0 1 880 t 0 5 3
_ 32 /	b) Algebraic product A.B
	(x) = (x) = (x) q. th
\$ 3	0 + 26 0 + 31 0 + 15 0 + 20 0 + 0 2 =
	1) Bounded gum TEIR
	(w) all + (x) tu, 1 nine = 900th
Sc2.	11 E1 L 1 + 3.1 L E 3 + 9] 1 Prim = 13 4
	51+1+1+100+03
	2 11 8 5

(ا	Bounded différence Maois (2)
	= max [0, Up(x) - Up(x)
	[8] Ju 10] 10 x 200 (7) 40111
2063	$= \max \left\{ 0, \left[\frac{0.1 + 0.1 + 0.2 + 0.5}{2}, \frac{7}{3} \right] \right\}$
,	= \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
5	20 20 30 40
4)	The discretised membership functions for a
	The discretised membership functions for a transistor and a register are
	UT = \ 0 + 0.2 + 0.7 + 0.8 + 0.9 + 1 ?
	UR = 30 + 0.1 + 0.3 + 0.2 + 0.4 +0.5 ?
	~ [0 1 2 3 4 5]
a)	Algebraic sum de A + B
	My + MR = MT (x) = MT (x) + MR (x) - MT (x). MR(x)
	$= \begin{bmatrix} 0 + 0.3 + 1.0 + 1.0 + 1.3 + 1.5 ? \\ 0 & 1 & 1 & 3 & 4 & 5 \end{bmatrix}$
	- [0 + 0.02 + 0.2] + 0.16 + 0.36 , 0.57
	= \(\frac{0}{1} \) \(\frac{1}{2} \) \(1
<u>b</u>	Algebraic product A.B
	UT. R (x) = UT (x). UB (x)
	= \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
c)	Bounded sum TAR
	Utor = min 1, Ut (x) + Uk (x)
	= min } 1, [0 + 0.3 + 1.0 + 1 + 1.3 + 1.5]?
	= \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \

	•
<u></u>	
·i)	B, UB, = max [MB, (x), MB, (x)]
	= \\\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \
-	7 . 1
i)	B2 00 (B2 = min [UB2 (2), UB, (X)]
	2 1·0 1·5 2·0 2·5 3·0 3
K)	B2 U B2 = max [UB2 (x), U62 (2)]
	21.0 + 0.6 + 0.9 + 0.9 + 1 }
3)	Consider two ferzy sets
	$A = \begin{cases} 0.2 & + 0.3 & + 0.4 & + 0.5 \end{cases}$
5	$B = \begin{cases} 0.1 + 4 & 0.2 + 0.2 + 1 & 2 \\ 2 & 3 & 4 & 4 \end{cases}$
,	
a)	Algebraic sum A+B (a) - MA (a) · MB (a)
	\$ 5 0.3 - 0.02 , 0.5 0-0.06 , 0.6 - 0.08 , \$5 - 0.5
5	= \$ 0.28 + 0.44 + 0.52 + 0.5 2 1 2 3 4
b)	Algebraic product A.B.
	MA. 8 = MA (2) · MG (2)
ì	2 2 3 4
و)	Bounded sum A@B
	MARON = min [1; My any Mg (xs)
	min { 1, [0.3 + 0.5 + 0.6 + a.5]}
	= \$ 10.3 + 0.5 + 0.6 + 0.6 + 0.6 }
	0 + 210 + 50 + 300 3 - 7



Pro)	i- Sivanandam pg. 264.
	Consider two juzzy sets
	(80A) aging (6
YXED	$\frac{A}{2} = \frac{1}{2} + \frac{0.3}{4} + \frac{0.5}{5} + \frac{0.2}{8} $
	$\beta = \left\{ \begin{array}{c} \frac{0.5}{2} + \frac{0.4}{4} + \frac{0.1}{6} + \frac{1}{8} \end{array} \right\}$
	perform union, intersection, complement & diff.
476U	ovce fuzzy sets A & B.
	Union: - AUB = max [Ma (x), Ma (x)]
	$= \left\{ \frac{1}{2} + \frac{0.4}{4} + \frac{0.5}{6} + \frac{01}{8} \right\}$
1	
	Intersection A OB = min [4 (x), 4 (x)]
	$= \underbrace{\begin{cases} 0.5 + 0.3 + 0.1 + 0.2 \\ 0.5 + 0.3 + 0.1 + 0.2 \end{cases}}_{(x)_{0}}$
	$(x)_{0}U_{1}(x)_{0}U_{1} - (x)_{0}U_{1} + (x)_{0}U_{1} + (x)_{0}U_{1} + (x)_{0}U_{1}$
3)	Complement A = 1- MA(x)
	2 4 2 6 8 3
	E = Francisco Con proli.
	= \ \frac{0.5}{2} \(\frac{1}{1000} \) \(\frac{0.6}{4} \) \(\frac{0.9}{1000} \) \(\frac{0.9}{10000} \) \(\frac{0.9}{100000} \) \(\frac{0.9}{100000} \) \(\frac{0.9}{100000} \) \(\frac{0.9}{100000} \) \(\frac{0.9}{1000000} \) \(\frac{0.9}{1000000000000000000000000000000000000
4)	Difference (a) 1 (a) aim = (10) AMALL
	AB = AOB = min [MA(2), ME(2)]
	$= \left\{ \frac{2}{0.5} + \frac{2}{0.3} + \frac{2}{0.5} + \frac{2}{0.5} \right\}$
	(1) 11 - (x) 11 , 0 YOM - HOALLS
	BIA = BOB = min [MB (x) ME (x)]
	$= \left\{ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	1 4 6 7 8

	Fuzzy set operations 100 19 mahananes
1)	Union (AUB)
	MAUB (x) = max. Ma(x), MB(x) = MA(x) V MB(x), 4xeu
	mar operator
2)	Intersection (AOB)
	MANB (x) = min [Mg(x), Mg(x)] = Mg(x) A Mg(x), HxEU
	Complement (A)
3)	Complement (A)
	$\mathcal{U}_{\overline{A}}(x) = 1 - \mathcal{U}_{A}(x) + \alpha \in U$
	Alaskai and CA+B)
4)	
Ţ.	μ _{A+B} (x) = μ _A (x) + μ _B (x) - μ _A (x).μ _B (x)
	(e) U, -1 = A tarasigno) (c
5)	Algebraic product (A-B)?
	$\mathcal{L}_{A \cdot B}(x) = \mathcal{L}_{A}(x) \cdot \mathcal{L}_{B}(x)$
6	Bounded sum (A + B)
	$\mathcal{U}_{ABB}(\alpha) = \min \left[1, \mathcal{U}_{A}(\alpha) + \mathcal{U}_{B}(\alpha) \right]$
#	Bounded difference (AOB)
	MAOB = max [0, MA(*)-MB(*)]
	Towall (x) gil Jain gan - Ala
	30 10 1 10 1 10
A Print of the	

Dr. Zadeh — Principle of complexity and impress — The closer one looks at a real world problem, the fuzzion becomes its solution. fuzzy logic — paradigm of impresisting into garnels — a tech to deal e impresisting into garnels — provides a mechanism for representing linguistic constructs such as 'high', low. — haved an notion of relative graded membersh — functions at cognitive processes. Impresise & Fuzzy logic decisions. Vague data system — F.LS accepting impresses & vague data & — providing a decision. — The utility at fuzzy sell lies in their ability to madel uncertain or ambiguous dala and to provide suitable decisions.		
The closes one looks at a seal world problem, the fuzzion becomes its solution. fuzzy logic — paradigm of computing & wards - a tech to deal & imprecision & into granular - providep a mechanism for representing linguistic constructs such as 'high', low. tall, many; few: - based an notion of relative graded membresh - functions of cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility of fuzzy sets lies in their ability to model uncertain or ambiguous data and to provide suitable decisions.		
The closes one looks at a seal world problem, the fuzzion becomes its solution. fuzzy logic — paradigm of computing & wards - a tech to deal & imprecision & into granula - providep a mechanism for representing linguistic constructs such as 'high', low. tall, many; few: - based an notion of relative graded membersh - functions of cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility of fuzzy sets lies in their ability to model uncertain or ambiguous data and to provide suitable decisions.		
problem, the fuzzion becomes its solution. fuzzy logic — paradigm of computing & wards. — a tech to deal & imprecision & into granula — provider a mechanism for representing linguistic constructs such as 'high' low. — tall, many; few. — hased an notion of relative graded membersh — tunetions of cognitive processes. Imprecise & Fuzzy logic decisions. Vague data system — FLS accepting imprecise & vague data & providing a decision. — The utility of fuzzy sets lies in their ability to model uncertain or ambiguous data and to provide suitable decisions	H-	
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- a tech to deal & imprecision & into granular - provided a mechanism for : representing linguistic constructs such as 'high', low. tall, many, few. - based on notion at relative graded membership - tunetions of cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility at fuzzy sets (i.es in their ability— to model uncertain or ambiguous data and to provide suitable decisions.		
inquistic constructs such as 'high', low. tall, many, few. - based an notion at relative graded membership - functions at cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility at fuzzy set (ies in their ability to model uncertain or ambiguous data and to provide suitable decisions		- a tech to deal & imprecision & into granular
- based on notion at relative graded membership functions of cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility of fuzzy sell (ies in their ability to model uncertain or ambiguous data and to provide suitable decisions.	المرتب	of provides a mechanism for representing
- based an notion of relative graded membership functions of cognitive processes. Imprecise & Fuzzy logic decisions. vague data system FLS accepting imprecise & vague data & providing a decision. The utility of fuzzy sets (i.e. in their ability to model uncertain or ambiguous data and to provide suitable decisions		
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Imprecise & Fuzzy logic decisions: vague data system FLS accepting imprecise & vague data & providing a decision. The utility of fuzzy sets lies in their ability to model uncertain or ambiguous data and to provide suitable decisions.		
FLS accepting imprecise fuague data & providing a decision. The utility of fuzzy sets lies in their ability to model uncertain or ambiguous dates and to provide suitable decisions.		and the same and days of lands
FLS accepting imprecise fuague data & providing a decision. The utility of fuzzy sets lies in their ability to model uncertain or ambiguous date and to provide suitable decisions.	- :	Imprecise & Fuzzy logic decisions.
The utility of fuzzy sets lies in their ability to model uncertain or ambiguous date and to provide suitable decisions.	-	vague aau gystem
The utility of fuzzy set lies in their ability to model uncertain or ambiguous date and to provide suitable decisions.	1006	
to model uncertain or ambiguous date and to provide suitable édecisions	-	
12 mater colorless; 12 man banest Yell Extremly bound (1) Extremly dishered (6) Very bound (6) board at temps (6-4)		to provide suitable édecisions.
(a) Around Marity (b) Around Marity (co) Around Marity (do) Complete Marity (do) Com		in mater colorless; to case boots?
(a) Armondale planed		(1) demod planets (1)
		10) temodile plansing
		Corol comet to traced
		The second secon

	SONAL,
10/2/2	FUZZY Set theory is significantly to be sonal.
	along love o to whatti Zanen pringigiositi
. ,	füzzinessi 2 suvaguenessi.
ub	entire real world is complex.
Lizalo	this complexity in arises from uncertainty
	uncertainty based on random processes
	and don't are doubt white the don't high low
	uncertainty is characterised by non-random processes
	- uncertainty due to partial into.
Girl Ld	de duc to inforthat is not fully reclasse
	- due to inherent imprecision in the language
	- due to receipt of into from multiple source
	about a problem e is conflicting.
	-> fazzy set theory provides effective problem
	solving approach.
	Fuzzy logic is a form of multivalued logic to deal
	with reasoning that is approximate rather mass
	Drecise :
	The stop ensuration of distinguished with
	crisp logic - fuzzy logiciative
1	Is water colorless? Is ram honest?
	y/p: extremly hones? (1)
	extremly dishonest (0)
	very honest (0.85)
	honest at times (0.4)
	nonest as armor (o t)
	ensp set furry set.
	ensp set fuzzy ser.