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Fuzzy assignment problem for hexagonal fuzzy Number using ones assignment method and Robust's Ranking technique

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Abstract
In 1965, Lotfi. A. Zadeh a professor of electrical engineering with the university Of California at Berkeley, published the first paper on his new theory of fuzzy sets and systems. Since the 1980's, this mathematical theory of "unsharp amounts "has been applied with great success in many fields. fuzzy sets and its earliest application originated has reminder largely unknown. The history of the theory of fuzzy sets and system and the ways it was first used will be incorporated into the history of 20th century science and technology.

Keywords: logic, Management science, operation research, robotics

1. Introduction
Here, we provide a method to solve fuzzy assignment problem (FAP), with fuzzy cost $c_{ij..}c_{ij}$ is considered to be hexagonal fuzzy number. 6 sales man are to be performed by 6 products. The objectives values of the objective function by robust's ranking method for transform the fuzzy assignment problem to a crisp one so that the fuzzy assignment problem.

2.1 Ones assignment algorithm using hexagonal fuzzy number
Step 1: In minimization or maximization case, find the minimum or maximum element of each row in the assignment matrix and write it on the right hand side of the 1.
Then divide each element 6 rows of the matrix by a_1 and a_6. In terms of ones for each for each row and column do assignment, otherwise go to step 2.
Step 2: Find the minimum or maximum element of each column in assignment matrix b_6, and write it below 6 columns. Then divide each element of 6 columns of the matrix by b_1 to b_6. These operations create at least one in each column.
Step 3: Draw the minimum or maximum number of lines to cover all the matrix. If the number of draw lines less than 6, then complete assignment is not possible, while if the number of lines is exactly equal to 6, then the complete assignment is obtained.
Step 4: If complete assignment program is not possible in step3, then select the smallest or largest element out of those which do not lie on any of the lines in the above matrix. Then divide by d_{ij} each element of the uncovered rows or columns, which d_{ij} lies on it. This operation creates some new ones to this row or column.
Priority plays an important role in this method, when we want to assign the ones. Priority rule, for minimization or maximization assignment problem, assign the ones on the row which have smallest or greatest element on the right-hand side, respectively.

2.2 Example
Let us consider fuzzy assignment problem with rows representing 6 salesmen A, B, C, D, E, F and columns representing 6 products. The problem is to find the optimal assignment of salesmen to products that will minimize total cost and maximum total cost.

Table 4.1

Salesmen → products ↓	A	B	C	D	E	F
1	(1,2,3,4,5,6)	(7,8,9,10,11,12)	(6,1,2,3,5,4)	(7,4,2,3,8,9)	(5,4,2,1,6,7)	(11,12,13,14,3,2)
2	(2,4,6,8,10,12)	(9,10,11,15,5,6)	(5,8,10,11,3,7)	(3,5,6,7,11,13)	(5,8,3,7,1,2)	(5,8,10,11,1,7)
3	(7,8,10,12,4,5)	(3,5,6,7,8,9)	(6,4,2,8,10,12)	(5,7,10,11,14,12)	(8,11,13,15,10,12)	(6,8,10,12,4,1)
4	(6,8,1,4,10,2)	(2,5,6,7,1,13)	(4,6,7,9,1,3)	(11,12,14,1,2,4)	(6,7,1,6,2,5)	(9,7,1,3,4,6)
5	(12,8,7,15,4,7)	(9,1,4,3,10,6,3)	(12,6,7,1,2,4)	(9,6,12,10,3,1)	(4,5,11,10,12,14)	(15,11,13,10,1,2)
6	(6,14,4,11,7,9)	(2,1,4,3,10,11)	(1,3,5,7,9,11)	(6,10,2,14,8,7)	(4,1,3,11,10,12)	(10,1,7,6,3,4)

Solution

The fuzzy assignment problem can be formulated in following

Min or max

{R (1,2,3,4,5,6) X_{11}+R (7,8,9,10,11,12) X_{12} +R (6,1,2,3,5,4) X_{13}+R (7,4,2,3,8,9) X_{14}+ R (5,4,2,1,6,7) X_{15} + R (11,12,13,14,3,2) X_{16}+ R (2,4,6,8,10,12) X_{21}+ R (9,10,11,15,5,6) X_{22}+ R (5,8,10,11,3,7)X_{23} + R (3,5,6,7,11,13) X_{24}+ R (5,8,3,7,1,2) X_{25}+ R (5,8,10,11,1,7)X_{26}+ R (7,8,10,12,4,5)X_{31}+R(3,5,6,7,89)X_{32}+ R(6,4,2,8,10,12)X_{33}+ R(5,7,10,11,14, 12)X_{34}+ R (8,11,13,15,10,12)X_{35} + R (6,8,10,12,14,1)X_{36}+R(6,8,1,10,2)X_{41}+R(2,5,6,7,1,13) X_{42}+ R (4,6,7,9,1,3) X_{43}+ R(11,12,14,1,2,4) X_{44}+ R(6,7,1,6,2,5)X_{45}+R(9,7,1,3,4,6)X_{46}+R(12,8,7,15,4,7)X_{51}+R(9,1,14,10,6,3)X_{52}+R(12,6,7,1,2,4)X_{53}+ R(9,6,12,10,3,1)X_{54}+R(4,5,11,10,12,14)X_{55}+R(15,11,13,10,1,2)X_{56}+R(6,14,4,11,7,9)X_{61}R(2,1,4,3,10,11)X_{62}+R(1,3,5,7,9,11)X_{63}+R(6,10,2,14,8,7)X_{64}+R(4,1,3,11,10,12)X_{65}+R(10,1,7,6,3)X_{66}

$$X_{11} + X_{12} + X_{13} + X_{14} + X_{15} + X_{16} = 1$$

$$X_{21} + X_{22} + X_{23} + X_{24} + X_{25} + X_{26} = 1$$

$$X_{31} + X_{32} + X_{33} + X_{34} + X_{35} + X_{36} = 1$$

$$X_{41} + X_{42} + X_{43} + X_{44} + X_{45} + X_{46} = 1$$

$$X_{51} + X_{52} + X_{53} + X_{54} + X_{55} + X_{56} = 1$$

$$X_{61} + X_{62} + X_{63} + X_{64} + X_{65} + X_{66} = 1$$

$$X_{ij} \in [0,1]$$

Now we calculate R (1,2,3,4,5,6) by applying Robust's ranking method using the membership function of hexagonal fuzzy number

$$\mu\tilde{A}(X) = \frac{1}{2}\left[\frac{X-1}{2-1}\right], for 1 \leq X \leq 2$$

$$\frac{1}{2} + \frac{1}{2}\left[\frac{X-2}{3-2}\right], for 2 \leq X \leq 3$$

$$1 \quad , for 3 \leq X \leq 4$$

$$1 - \frac{1}{2}\left[\frac{x-4}{5-4}\right], for 4 \leq x \leq 5$$

$$\frac{1}{2}\left[\frac{6-X}{6-5}\right], for 5 \leq X \leq 6$$

0, otherwise

The a-cut of the fuzzy number (1,2,3,4,5,6) is (a^L_{ha}, a^U_{ha}) = (2a+1, 2a+1,6-2a,6-2a)

$$R(\tilde{A}_{1,1}) = R(1,2,3,4,5,6) = \int_0^1 0.5\ (a^L_{ha}, a^U_{ha})\ da$$

$$= \int_0^1 0.5\,(14)\ da = 7$$

$$R(\tilde{A}_{1,2}) = R(7,8,9,10,11,12) = \int_0^1 0.5\ (2a + 7, 2a + 7, 12 - 2a, 12 - 2a)\ da$$

$$= \int_0^1 0.5\,(38)\ da = 19$$

$$R(\tilde{A}_{1,3}) = R(6,1,2,3,5,4) = \int_0^1 0.5\ (-10a + 6, 2a, 4a - 1, 12 - 2a)\ da$$

$$= \int_0^1 0.5\,(11)\ da = 5.5$$

$$R(\tilde{A}_{1,4}) = R(7,4,2,3,8,9) = \int_0^1 0.5\,(7-6a, 6-4a, -10a+13, 9-2a)\,da$$

$$= \int_0^1 0.5\,(11)\,da = 5.5$$

$$R(\tilde{A}_{1,5}) = R(5,4,2,1,6,7) = \int_0^1 0.5\,(-2a+5, 6-4a, 10a-9, 7-2a)\,da$$

$$= \int_0^1 0.5\,(11)\,da = 5.5$$

$$R(\tilde{A}_{1,6}) = R(11,12,13,14,3,2) = \int_0^1 0.5\,(2a+11, 2a+11, -22a+36, 2a+2)\,da$$

$$= \int_0^1 0.5\,(44)\,da = 22$$

$$R(\tilde{A}_{2,1}) = R(2,4,6,8,10,12) = \int_0^1 0.5\,(4a-2, 4a-2, 12-4a, 9-a)\,da$$

$$= \int_0^1 0.5\,(24)\,da = 12$$

$$R(\tilde{A}_{2,2}) = R(9,10,11,15,5,6) = \int_0^1 0.5\,(9+2a, 2a+9, -2a+6, 20a-35)\,da$$

$$= \int_0^1 0.5\,(11)\,da = 5.5$$

$$R(\tilde{A}_{2,3}) = R(5,8,10,11,3,7) = \int_0^1 0.5\,(6a+5, 4a+6, -2a+4, 16a-5)\,da$$

$$= \int_0^1 0.5\,(34)\,da = 17$$

$$R(\tilde{A}_{2,4}) = R(3,5,6,7,11,13) = \int_0^1 0.5\,(4a+3, 2a+4, 15-8a, 13-4a)\,da$$

$$= \int_0^1 0.5\,(29)\,da = 14.5$$

$$R(\tilde{A}_{2,5}) = R(7,4,2,3,8,9) = \int_0^1 0.5\,(6a+5, -10a+13, 12a-5, 2-2a)\,da$$

$$= \int_0^1 0.5\,(21)\,da = 10.5$$

$$R(\tilde{A}_{2,6}) = R(7,4,2,3,8,9) = \int_0^1 0.5\,(7-6a, 6-4a, -10a+13, 9-2a)\,da$$

$$= \int_0^1 0.5\,(100)\,da = 10$$

$$R(\tilde{A}_{3,1}) = R(7,8,10,12,4,5) = \int_0^1 0.5\,(2a+7, 4a+6, 16a-4, 5-2a)\,da$$

$$= \int_0^1 0.5\,(33)\,da = 16.5$$

$$R(\tilde{A}_{3,2}) = R(3,5,6,7,8,9) = \int_0^1 0.5\,(4a+3, 2a+4, 9-2a, 9-2a)\,da$$

$$= \int_0^1 0.5\,(27)\,da = 13.5$$

$$R(\tilde{A}_{3,3}) = R(6,4,2,8,10,12) = \int_0^1 0.5\,(6-4a, 6-4a, 12-4a, 4a+12)\,da$$

$$= \int_0^1 0.5\,(28)\,da = 14$$

$$R(\tilde{A}_{3,4}) = R(5,7,10,11,14,12) = \int_0^1 0.5\,(4a+5, 6a+4, 4a+12, 17-6a)\,da$$

$$= \int_0^1 0.5\,(38)\,da = 19$$

$$R(\tilde{A}_{3,5}) = R(8,11,13,15,10,12) = \int_0^1 0.5\,(2a+5, 4a-1, 10a+5, 12-4a)\,da$$

$$= \int_0^1 0.5\,(33)\,da = 14.5$$

$$R(\tilde{A}_{3,6}) = R(6,8,10,12,14,1) = \int_0^1 0.5\,(4a+6, 4a+6, 16-4a, 26a-1)\,da$$

$$= \int_0^1 0.5\,(57)\,da = 28.5$$

$$R(\tilde{A}_{4,1}) = R(6,8,1,4,10,2) = \int_0^1 0.5\,(4a+6, -14a+15, 16-12a+6a+2)\,da$$

$$= \int_0^1 0.5\,(23)\,da = 11.5$$

$$R(\tilde{A}_{4,2}) = R(2,5,6,7,1,1,3) = \int_0^1 0.5\,(6a+2, 2a+4, 12a+5, 13-24a)\,da$$

$$= \int_0^1 0.5\,(100)\,da = 10$$

$$R(\tilde{A}_{4,3}) = R(4,6,7,9,1,3) = \int_0^1 0.5\,(4a+4, 2a+5, 7-16a, 3-4a)\,da$$

$$= \int_0^1 0.5\,(5)\,da = 2.5$$

$$R(\tilde{A}_{4,4}) = R(11,12,14,1,2,4) = \int_0^1 0.5\,(2a+11, 4a+10, 3-2a, 4-4a)\,da$$

$$= \int_0^1 0.5\,(28)\,da = 14$$

$$R(\tilde{A}_{4,5}) = R(6,7,1,6,2,5) = \int_0^1 0.5\,(2a+6, 13-12a, 8a-2, 5-6a)\,da$$

$$= \int_0^1 0.5\,(14)\,da = 7$$

$$R(\tilde{A}_{4,6}) = R(9,7,1,3,4,6) = \int_0^1 0.5\,(9-4a, 13-12a, 5-2a, 6-4a)\,da$$

$$= \int_0^1 0.5\,(11)\,da = 5.5$$

$$R(\tilde{A}_{5,1}) = R(12,8,7,15,4,7) = \int_0^1 0.5\,(12-8a, 9-2a, 7-6a, 22a-7)\,da$$

$$= \int_0^1 0.5\,(30)\,da = 15$$

$$R(\tilde{A}_{5,2}) = R(9,1,14,10,6,3) = \int_0^1 0.5\,(-16a+9, 6a+3, 26a-12, 8a+2)\,da$$

$$= \int_0^1 0.5\,(26)\,da = 13$$

$$R(\tilde{A}_{5,3}) = R(12,6,7,1,2,4) = \int_0^1 0.5\,(-12a+12, 4-4a, 2a+5, 3-2a)\,da$$

$$= \int_0^1 0.5\,(8)\,da = 4$$

$$R(\tilde{A}_{5,4}) = R(9,12,11,10,12,14) = \int_0^1 0.5\,(7-6a, 6-4a, -10a+13, 9-2a)\,da$$

$$= \int_0^1 0.5\,(11)\,da = 5.5$$

$$R(\tilde{A}_{5,5}) = R(4,5,11,10,12,14) = \int_0^1 0.5\,(2a+4, 14-4a, 12a-1, 14-4a)\,da$$

$$= \int_0^1 0.5\,(37)\,da = 18.5$$

$$R(\tilde{A}_{5,6}) = R(15,11,13,10,1,2) = \int_0^1 0.5\,(-8a+15, 2-2a, 4a+9, 18a+2)\,da$$

$$= \int_0^1 0.5\,(40)\,da = 20$$

$$R(\tilde{A}_{6,1}) = R(6,14,4,11,7,9) = \int_0^1 0.5\,(16a+6, 9-4a, -20a+24, 8a+2)\,da$$

$$= \int_0^1 0.5\,(41)\,da = 20.5$$

$$R(\tilde{A}_{6,2}) = R(2,10,4,3,10,11) = \int_0^1 0.5\,(16a+2, -12a+16, 14a-11, 11-2a)\,da$$

$$= \int_0^1 0.5\,(34)\,da = 17$$

$$R(\tilde{A}_{6,3}) = R(1,3,5,7,9,11) = \int_0^1 0.5\,(4a + 1, 11 - 4a, 11 - 4a, 11 - 4a, 2a + 2)\,da$$

$$= \int_0^1 0.5\,(23)\,da = 11.5$$

$$R(\tilde{A}_{6,4}) = R(6,10,2,14,8,7) = \int_0^1 0.5\,(8a + 6, 18 - 16a, 12a + 2, 2a + 7)\,da$$

$$= \int_0^1 0.5\,(39)\,da = 19.5$$

$$R(\tilde{A}_{6,5}) = R(4,1,3,11,10,12) = \int_0^1 0.5\,(4 - 6a, 4a - 1, 2a + 9, 12 - 4a)\,da$$

$$= \int_0^1 0.5\,(20)\,da = 10$$

$$R(\tilde{A}_{6,6}) = R(10,1,7,6,3,4) = \int_0^1 0.5\,(10 - 18a, 4 - 2a, 12a - 5, 12 - 6a)\,da$$

$$= \int_0^1 0.5\,(7)\,da = 3.5$$

We get, the assignment matrix

1	7	19	5.5	5.5	5.5	22
2	12	5.5	17	14.5	10.5	10
3	16.5	13.5	14	19	14.5	28.5
4	11.5	10	2.5	14	7	5.5
5	15	13	4	18.5	18.5	20
6	20.5	17	11.5	19.5	10	3.5

Step 1

In a minimization case, find the minimum element of each row in the assignment matrix and write it on the right hand side of the matrix. Then divide each element 6 rows of the matrix by $a_1$to a_6. Column do assignment, otherwise go

Table 1

	1	**2**	**3**	**4**	**5**	**6**	**Min**
1	7	19	5.5	5.5	5.5	22	5.5
2	12	5.5	17	14.5	10.5	10	5.5
3	16.5	13.5	14	19	14.5	28.5	13.5
4	11.5	10	2.5	14	7	5.5	2.5
5	15	13	4	18.5	18.5	20	4
6	20.5	17	11.5	19.5	10	3.5	3.5

Table 2

	1	**2**	**3**	**4**	**5**	**6**
1	7/15	19/5.5	1	1	1	22/5.5
2	12/5.5	1	17/5.5	14.5/5.5	10.5/5.5	10/5.5
3	16.5/13.5	1	14/13.5	19/13.5	14.5/13.5	28.5/13.5
4	11.5/2.5	10/2.5	1	14/2.5	7/2.5	5.5/2.5
5	15/4	13/4	1	18.5/4	18.5/4	20/4
6	20.5/3.5	17/3.5	11.5/3.5	19.5/3.5	10/3.5	1

Table 3

	1	**2**	**3**	**4**	**5**	**6**
1	1.8	3.5	1	1	1	4
2	2.2	1	3.1	2.6	1.9	1.8
3	1.2	1	1	1.4	1.1	2.1
4	4.6	4	1	5.6	2.8	2.2
5	3.6	3.3	1	4.6	4.6	5
6	5.8	4.9	3.2	5.5	2.8	1

Step 2

Find the minimum element of each column in assignment matrix b_6, and write it below 6 columns. Then divide each element of 6 columns of the matrix by $b_1$to b_6. These operations create at least one ones in each columns

Table 4

	1	2	3	4	5	6
1	1.8	3.5	1	1	1	4
2	2.2	1	3.1	2.6	1.9	1.8
3	1.2	1	1	1.4	1.1	2.1
4	4.6	4	1	5.6	2.8	2.2
5	3.6	3.3	1	4.6	4.6	5
6	5.8	4.9	3.2	5.5	2.8	1
Min	1.2	1	1	1	1	1

Table 5

	1	2	3	4	5	6
1	1.8/1.2	3.5	1	1	1	4
2	2.2/1.2	1	3.1	2.6	1.9	1.8
3	1.2/1.2	1	1	1.4	1.1	2.1
4	4.6/1.2	4	1	5.6	2.8	2.2
5	3.6/1.2	3.3	1	4.6	4.6	5
6	5.8/1.2	4.9	3.2	5.5	2.8	1

Table 6

	1	2	3	4	5	6
1	1.5	3.5	1	1	1	4
2	1.8	1	3.1	2.6	1.9	1.8
3	1	1	1	1.4	1.1	2.1
4	3.8	4	1	5.6	2.8	2.2
5	3	3.3	1	4.6	4.6	5
6	4.8	4.9	3.2	5.5	2.8	1

Step 3

If the number of lines is exactly equal to 6, then the complete assignment is obtained while if the number of draw lines less than 6 got to step 4

Table 7

	1	2	3	4	5	6
1	1.5	3.5	1	(1)	1	4
2	1.8	(1)	3.1	2.6	1.9	1.8
3	(1)	1	1	1.4	1.1	2.1
4	3.8	4	(1)	5.6	2.8	2.2
5	3	3.3	1	4.6	4.6	5
6	4.8	4.9	3.2	5.5	2.8	(1)

Step 4

If a complete assignment program is not possible in step3, then select the smallest element out of those which do not lie on any of the lines in the above matrix. Then divide by d_{ij} each element of the uncovered rows, which d_{ij} lies on it. Make assignment in terms of ones.

Table 8

	1	2	3	4	5	6
1	1.5	3.5	1	1	(1)	4
2	1.8	(1)	3.1	1.4	1.1	1
3	(1)	1	1	1.3	1	1.9
4	3.8	4	(1)	2.5	1.2	1
5	3	3.3	1	(1)	1	1.1
6	4.8	4.9	3.2	5.5	2.8	(1)

The solution is (1,5), (2,2), (3,1), (4,3) (5,4), (6,6)

The fuzzy optimal minimum total coast $=\tilde{A}_{15} + \tilde{A}_{22} + \tilde{A}_{31} + \tilde{A}_{43} + \tilde{A}_{54} + \tilde{A}_{66}$

R (5,4,2,1,6,7) X_{15}+R (9,10,11,15,5,6) X_{22}+R (7,8,10,12,4,5)X_{31}+R (4,6,7,9,1,3) X_{43}+R(9,6,12,10,3,1)X54+R(10,1,7,6,3)X_{66} = R(44, 35, 49, 53, 22, 26)

Similarly we find the method for maximum total cost

Step 1

In a maximization case, find the maximum element of each row in the assignment matrix and write it on the right hand side of the matrix. Then divide each element 6 rows of the matrix $a_1$toa_6.create at least one ones in each rows.

Table 9

	1	2	3	4	5	6	Max
1	7	19	5.5	5.5	5.5	22	22
2	12	5.5	17	14.5	10.5	10	17
3	16.5	13.5	14	19	14.5	28.5	28.5
4	11.5	10	2.5	14	7	5.5	14
5	15	13	4	18.5	18.5	20	20
6	20.5	17	11.5	19.5	10	3.5	20.5

Table 10

	1	2	3	4	5	6
1	7/22	19/22	5.5/22	5.5/22	5.5/22	1
2	12/17	5.5/17	1	14.5/17	10.5/17	10/17
3	16.5/28.5	13.5/28.5	14/28.5	19/28.5	14.5/28.5	1
4	11.5/14	10/14	2.5/14	1	7/14	5.5/14
5	15/20	13/20	4/20	18.5/20	18.5/20	1
6	1	17/20.5	11.5/20.5	19.5/20.5	10/20.5	3.5/20.5

Table 11

	1	2	3	4	5	6
1	0.31	0.86	0.25	0.25	0.25	1
2	0.7	0.32	1	0.85	0.61	0.58
3	0.56	0.47	0.49	0.66	0.50	1
4	0.82	0.71	0.17	1	0.5	0.39
5	0.75	0.65	0.2	0.92	0.92	1
6	1	0.82	0.56	0.95	0.48	0.17

Step 2

Find the maximum element of each column in assignment matrix b_6, and write it below 6 columns. Then divide each element of 6 columns of the matrix by b_1 to b_6.

Table 12

	1	2	3	4	5	6
1	0.31	0.86	0.25	0.25	0.25	1
2	0.7	0.32	1	0.85	0.61	0.58
3	0.56	0.47	0.49	0.66	0.50	1
4	0.82	0.71	0.17	1	0.5	0.39
5	0.75	0.65	0.2	0.92	0.92	1
6	1	0.82	0.56	0.95	0.48	0.17
Max	1	0.86	1	1	0.92	1

Table 13

	1	2	3	4	5	6
1	0.31	0.86/0.86	0.25	0.25	0.25/0.92	1
2	0.7	0.32/0.86	1	0.85	0.61/0.92	0.58
3	0.56	0.47/0.86	0.49	0.66	0.50/0.92	1
4	0.82	0.71/0.86	0.17	1	0.5/0.92	0.39
5	0.75	0.65/0.86	0.2	0.92	0.92/0.92	1
6	1	0.82/0.86	0.56	0.95	0.48/0.92	0.17

Table 14

	1	2	3	4	5	6
1	0.31	1	0.25	0.25	0.27	1
2	0.7	0.37	1	0.85	0.66	0.58
3	0.56	0.54	0.49	0.66	0.54	1
4	0.82	0.82	0.17	1	0.54	0.39
5	0.75	0.75	0.2	0.92	1	1
6	1	0.95	0.56	0.95	0.52	0.17

Step 3
Make assignment in terms of ones

Table 15

	1	2	3	4	5	6
1	0.31	(1)	0.25	0.25	0.27	1
2	0.7	0.37	(1)	0.85	0.66	0.58
3	0.56	0.54	0.49	0.66	0.54	(1)
4	0.82	0.82	0.17	(1)	0.54	0.39
5	0.75	0.75	0.2	0.92	(1)	1
6	(1)	0.95	0.56	0.95	0.52	0.17

The solution is (1,2), (2,3), (3,6), (4,4), (5,5), (6,1)
The fuzzy optimal maximum total cost = R (7,8,9,10,11,12) X_{12}+R (5,8,10,11,3,7)X_{23}+R(6,8,10,12,14,1)X_{36}+ R(11,12,14,1,2,4) X_{44}+R(4,5,11,10,12,14)X_{55}+R(6,14,4,11,7,9)X_{61}
=R(39,55,58,55,49,47)

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