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MARKETING OUTSOURCING – EFFICIENT WAY TO MANAGE OUTSOURCING

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Keywords: outsourcing, control outsourcing, marketing, outsourcing marketing, construction business, systems outsourcing, contract outsourcing, development

Annotation: The Russian economic literature the theme of "management outsourcing" is not well understood. Appropriate in view playback requirements for the development of mechanisms for managing outsourcing introduce a new concept -"Marketing Outsourcing", which will allow scientists to more fully explore the process of creating mechanisms for the management of out-sourcing. Since the development of outsourcing is gaining momentum, especially in the construction sector, the research methods and mechanisms for managing outsourcing for small and medium-sized businesses in the construction industry is very important. Marketing management outsourcing helps companies increase their capacity to expand its range of products (services rendered) without loss of qual-operation and without the involvement of low-skilled employees. Particularly important application of marketing management outsourcing arrangements in the construction in the Moscow region, as well as by the addition of new areas significantly increased the demand for construction services since 2012.

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ТЕОРИИ ГРАФОВ ОДНОГО МЕТОДА ДЛЯ НЕЧЕТКИХ ЗАДАЧ И РАНЖИРОВАНИЯ НЕЧЕТКИХ ЧИСЕЛ

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Ключевые слова: нечеткие числа, нечеткое упорядочение; нечеткий рейтинг.

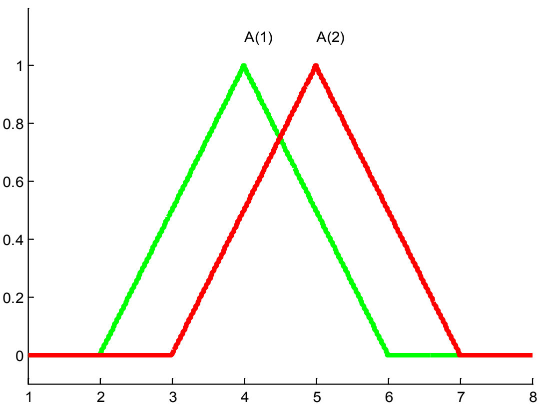
Аннотация: В статье сделана попытка в определении нечетких задач, а также ранжирование, от меньшего к большему, любого конечного множества нечетких чисел при помощи программного обеспечения MATLAB.

1. Introduction

We will consider two ways to fuzzy order a finite set of fuzzy numbers:(1)using a weak fuzzy ordering($\geq$) in the next section; and (2)using a strong fuzzy ordering(«>»)in the third section. By a fuzzy ordering we mean that the value of the comparison $\overline{M} \leq (<,\geq,>)\overline{N}$, for two fuzzy numbers $\overline{M}$ and $\overline{N}$, will be a number in the interval [0,1] By an ordering (or crisp ordering) we mean that the value of the comparison is either zero or one.

All our fuzzy sets will be fuzzy subsets of the real numbers. So, $\overline{M}, \overline{N}, \overline{A_i},...$ all represent fuzzy subsets of the real numbers. If $\overline{A}$ is a fuzzy set, then $\overline{A}(X) \in [0,1]$ is the membership function for $\overline{A}$, written $\overline{A}[a]$, is defined as $\{x|\overline{A}(x(\geq a\}, for\, 0 < a \leq 1$. $\overline{A}[0]$ is separately defined as the closure of the union of all the $\overline{A}[a], 0 < a \leq 1$. a fuzzy number $\overline{N}$ is a fuzzy subset of the real numbers satisfying (1) $\overline{N}(x) = 1$ for some χ (normalized); and (2) $\overline{N}[a]$ is a closed, bounded, interval for $0 \leq a \leq 1$ a triangular fuzzy number $\overline{T}$ is defined by three numbers $a_1 < a_2 < a_3$ where the $(\overline{T}(a_2) = 1)$. We write $\overline{T} = (a_1 / a_2 / a_3)$ for triangular fuzzy numbers. [10]

If $S = \{A_1,..., A_n\}$, then we can form the fuzzy relation $\overline{R} = [T_{ij})$, a n*n matrix, where $T_{ij} = v(\overline{A}_i > \overline{A}_j)$ we will also use $\geq$ to construct $\overline{R} = [T_{ij}]$ a $\times n$ matrix, where $T_{ij}^w = v(\overline{A}_i > \overline{A}_j)$ We will also use $\geq$ to construct $\overline{R}$. We will use the notation $v_{ij}^w = v(\overline{A}_i \geq \overline{A}_j)$ and $v_{ij}^s = \overline{A}_i > \overline{A}_j)$, where the superscript «w» denotes a weak fuzzy order and the superscript «s» stands for strong fuzzy order.



1. Fuzzy order . zebardast

What we are after in this paper is a unique ordering of any finite set of fuzzy numbers, from smallest to largest, different from those previously proposed in the literature ,also having this ranking produce a maximum and minimum for the finite set of fuzzy numbers

Example

Let the fuzzy relation matrix, for a finite set of four fuzzy numbers, be

Where we used $v_j^s + v_j^s = 1, i \neq j$. $\overline{R}$ is not transitive. The rows (columns) are labeled $\overline{A}_1, \ldots, \overline{A}_4$ now look

$$\overline{R} = \begin{pmatrix} 0 & 0.7 & 0.4 & 0.7 \\ 0.3 & 0 & 0.7 & 0.3 \\ 0.6 & 0.3 & 0 & 0.8 \\ 0.3 & 0.7 & 0.2 & 0 \end{pmatrix}$$

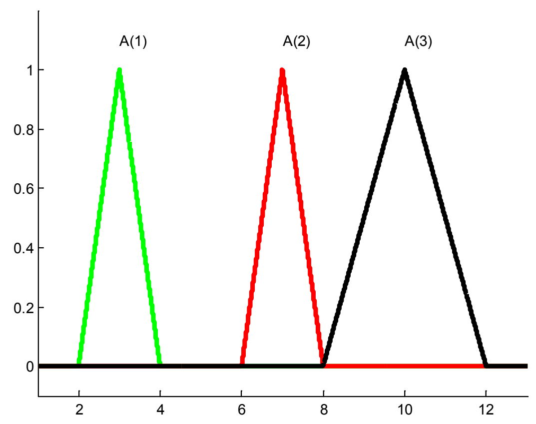
at all possible rankings of $\overline{A}_1$ through $\overline{A}_4$ from smallest to largest.

They are $\overline{A}_3, \overline{A}_2, \overline{A}_1$ and $\overline{A}_3, \overline{A}_2, \overline{A}_1$. Delete the second row and column of $\overline{R}$ which is to delete $\overline{A}_2$. There is now one ranking, from smallest to largest, with maximum value 0.6. It is $\overline{A}2, \overline{A}1, \overline{A}3$ we have a major rank reversal because now $\overline{A}_3$ if ranked first (largest) the possibility of rank reversal can poise a major problem in decision analyses

Example 1: if A(1):[4,3.2] and A(2):[8,7,6] and A(3):[12,10,8]

The order of fuzzy numbers, from min to max is

A (1):
2 3 4
A(2):
6 7 8
A(3):
8 10 12
:*
1.000010000096196e-005 3.000030000332998e-005 1.000010000140605e-005
1.000000000000000e+000 1.000010000140605e-005 0
1.000000000000000e+000 1.000000000000000e+000 1.000010000140605e-005
A(1)>A(2)& A(1)>A(3) is: 1e-005
A(2)>A(1)& A(2)>A(3) is: 0
A(3)>A(1)& A(3)>A(2) is: 1
A(1)>A(2) is: 3e-005
A(2)>A(1) is: 1



2. The order of fuzzy numbers, from min to max. zebardast

Maximum /Minimum

Given a finite set of distinct fuzzy numbers $S = \{\overline{A}_1, \ldots, \overline{A}_n\}$ we wish to find the maximum and minimum of S. There is fuzzy max (min) written $\overline{\max(\min)}$, but usually $\overline{\max}S(\overline{\min}S)$ is not a member of S. this has caused problems in some applications. See for example the fuzzy shortest path problem (see the reference is this paper). We now specify the max (min) of S which will belong to S. We will use a strong fuzzy ordering and the results of the previous section

consider how a person would go about finding the max (min) of a finites set $\{a_1, \ldots, a_4\}$ of distinct real numbers. The person may employ the following set of four rules, of which we only list the first and last rule

$R_1 \, f \, [a_1 > a_2 \, true] \, and \, [a_1 > a_3 \, true] \, and [a_1 > a_4 \, true] \, then \max = a_1 \, true$

$R_4 \, f \, [a_1 > a_2 \, true] \, and \, [a_4 > a_2 \, true] \, and [a_4 > a_3 \, true] \, then \max = a_4 \, true$

Fuzzify the rules producing

$R_1 \, f \, [\overline{A}_1 > \overline{A}_2] \, and \, [\overline{A}_1 > \overline{A}_3] \, and [\overline{A}_1 > \overline{A}_4], the \max = \overline{A}_1;$

$R_1 \, f \, [\overline{A}_4 > \overline{A}_1] \, and \, [\overline{A}_4 > \overline{A}_2] \, and [\overline{A}_4 > \overline{A}_3], the \max = \overline{A}_4;$

We set the value of $[\overline{A}_i > \overline{A}_j]$ to be $v(\overline{A}_i > \overline{A}_j) = v_j^s$. The value of [max=A1] is, from the first fuzzy rule above min ($v_{12}^s, v_{13}^s, v_{14}^s$). Since only on ranking has positive value only one $[\max = \overline{A}_i]$ has positive value and that one give maxi. Similarly we get mines. Max has the following properties (similar properties for min) If max=$\overline{A}_i$, choose some $\overline{A}_j$ and substitute $\vec{A} = \overline{A}_j + x, for \, some \, x > 0, \, for \, \overline{A}_j$, then max remains the same or it could changes to $\vec{A}$ If max= $\overline{A}_i$ and we add another fuzzy numbers $\vec{A}$ to S, then the max remains the same or it could change to $\vec{A}$.

where the original ordering is $\overline{A}_3\overline{A}_1\overline{A}_4\overline{A}_2$ so the max= $\overline{A}_2$ Now let $\overline{A} = \overline{A}_1 + x \, for \, x > 0$ and substitute $\overline{\overline{A}}$ for $\overline{A}_1$ the method applied to $S = \{\overline{A}_3, \overline{A}1, \overline{A}_4, \overline{A}_2,\}$ gives a unique second final ranking and we now show that max cannot be $\overline{A}_3$, or $\overline{A}_4$. Suppose the second ranking produces max= $\overline{A}_3$ (same argument holds if $\overline{A}_4$). Then in the original ranking $v(\overline{A}_2 > \overline{A}_3) > 0$ and in the second ranking $v(\overline{A}_3 > \overline{A}_2) > 0$ which is impossible for a strong fuzzy ordering

Graph theory result:

A directed graph consists of a set of n vertices $v = \{v_1, \ldots, v_n\}$ and a set of arcs A. A is a set of ordered pairs of vertices in V if $u, v \in A$, then there is a directed are (one – way street) from U to V . A tournament is a directed graph so that for all $u \neq v$ in V, we have (u,v) $\in A, or \, (v.u) \in A$ but not both . A tournament is transitive if whenever $(u,v)\in A, and (v.w)\in A$ and $u\neq w,$ then (u,w)∈ A. A complete simple path in a directed graph is a $p = u_{i1},...,u_{in}$ where $(i_1,\dots, i_n)$ is a permutation of (1,2,3, …,n) in P each vertex appears only once and we interpret p as the path from ui1 to u_{i2} along directed are (u_{i1},u_{i2}) ∈ A, ….,from u_{in-1} to u_{in} along directed arc(u_{in-1},u_{in}) ∈A

We now show that every transitive tournament has a unique complete simple path. The proof is in two parts: (1) part 1 shows that every tournament has a complete simple path, and (2) part 2 shows that any transitive tournament has a unique complete simple path.

Part 1

The proof is by induction on the number of vertices n. Surely it is true when n =2 Assume it is true for tournaments with n>2 vertices and we argue that it must also be true for tournaments with n+1 vertices so that (w,u_i) ∈A or (u_i,w) ∈ A but not both , for $1\leq i\leq n$ n. There is a complete simple path ui1,…, u_{in} in the original tournament with n retires. If (w,u_{i1}) ∈A, then the complete simple path is w , ui1,… ,u_{in},

So assume that (w,u_{i1}) in not in A. let k be the largest positive integer so that (w,u_{ik}) does not belong to A, if k<n, then(u_{ik},w) ∈A and (w,u_{ik+1}) ∈A and the complete simple path is ui1,…,u_{ik},w,u_{ik+1},…,u_{in}.. If $k = n, then (u_{in}, w)\in A$ and u_{i1},…,u_{in},w is the complete simple path

Part 2

Now we have transitive tournament. In a complete simple path u_{i1},…u_{in} we say that u_{i1} follows, or is reachable from, u_{ik} if l>l

Let p_1 and p_2 be two different complete simple paths. Then we must have $u\neq v$ in V so that v follows v in p_1 and v follows u in p_2. If u follows v in p_1 and the tournament is transitive, we can show by induction that (u,v) ∈A. similarly for p_2 we can show that (u,v) ∈A . This contradicts the basic property of tournaments; the set of fuzzy numbers (n) is not too large. Software can be made to do this when n is large Assume we have six fuzzy numbers. $\overline{A}_i, 1\leq i\leq 6,$ to rank and all the values v_{ij}^s =0 but both are zero , for $i\neq j$. We know that v_{ii}^s =0 for all i. start with $\overline{A}_1$ and $\overline{A}2$ and look at v_{12}^s and v_{12}^s . One of these is not zero and assume it is v_{12}^s >0.

The ranking starts out $\overline{A}_1\overline{A}_2$, Now we enter the rest of the v_{32}^s , v_{31}^sne – by – one . Enter A_3 and look at in the order form left to right choosing the first non-zero value (when they are not all zero). Assume that in this case they all turn out to be zero, then the ordering is $\overline{A}_3\overline{A}_1\overline{A}_2$. Enter A_4 and consider v_{42}^s , v_{41}^s v_{43}^s in the other from left to right picking the first non – zero value (when they are not all zero). Assume that the first non – zero number is $v_4^s > 0$ and then the ordering is $A_3A_1A_4A_2$. Enter A_5 and study $v_{52}^s, v_{54}^s v_{51}^s, v_{53}^s$ from left to right getting the first one that is not zero (assuming there are not all zero) Assume the first non – zero is v_3^s >0 . Then the ordering is $\overline{A}_3\overline{A}_5\overline{A}_1\overline{A}_4\overline{A}_2$. Enter $\overline{A}_6$ and consider the sequence $v_{62}^s, v_{64}^s v_{61}^s, v_{65}^s, v_{63}^s$ choosing, form left to right the first non –zero value (when all are note equal to zero)

Assume the first one is v_{62}^s >0 and then the final ordering is $\overline{A}_3\overline{A}_5\overline{A}_1\overline{A}_4\overline{A}_2\overline{A}_6$

EXAMPLE 3:

A(1) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [3,5,1,8]
A(2) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [3,8,1,15]
A(3) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [1,3,1,4]
A(4) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [2,7,1,11]
A(5) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [2,4,1,6]
A(6) [a,b,wb=1,c]/[a,b,wb=1,c,wc=1,d]: [1,9,1,20]

6.666733334048658e-006 6.000060000621588e-006 6.666766667666675e-001 0
2.500075000750011e-001
3.750097500975009e-001 6.000060000621588e-006
8.333483334833347e-001 1.111136111361113e-001
5.714437144371445e-001
1.000010000096196e-005 1.000010000096196e-005
0 8.000080000680754e-006 1.000010000096196e-005
2.500045000450004e-001 1.000010000096196e-005 6.666746667466674e-001 0
4.285842858428584e-001
1.000010000085094e-005 1.000010000096196e-005 3.333383333833337e-001 0
1.000010000096196e-005
3.636369697030304e-001 6.667066670666699e-002
6.666766667666675e-001 1.666754167541675e-001
5.000100001000010e-001

Column 6

2.727300000171518e-006
2.727300000171518e-006
2.727300000171518e-006
2.727300000171518e-006
2.727300000171518e-006
2.727300000171518e-006

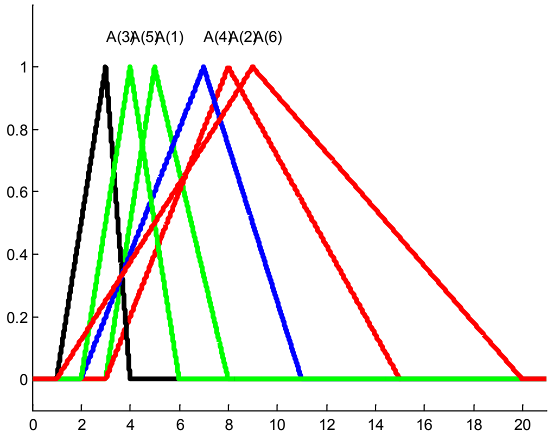
R*:

6.666733334048658e-006 6.249962499624997e-001
6.666766667666675e-001 7.499954999549996e-001
2.500075000750011e-001
3.750097500975009e-001 6.000060000621588e-006
8.333483334833347e-001 1.111136111361113e-001
5.714437144371445e-001
3.333333333333335e-001 1.666616666166663e-001
0 3.333333333333333e-001 6.666716667166672e-001
2.500045000450004e-001 8.888963889638897e-001 6.666746667466674e-001 0
4.285842858428584e-001
7.500025000249998e-001 4.285662856628565e-001
3.333383333833337e-001 5.714157141571417e-001
1.000010000096196e-005
3.636369697030304e-001 6.667066670666699e-002
6.666766667666675e-001 1.666754167541675e-001
5.000100001000010e-001

Column 6

6.363657575969698e-001
9.333320605933332e-001
3.333260605333327e-001
8.333273105458326e-001
4.999927271999992e-001
2.727300000171518e-006

A(1)>A(2)& A(1)>A(3)& A(1)>A(4)& A(1)>A(5)& A(1)>A(6) is: 0
A(2)>A(1)& A(2)>A(3)& A(2)>A(4)& A(2)>A(5)& A(2)>A(6) is: 2.7273e-006
A(3)>A(1)& A(3)>A(2)& A(3)>A(4)& A(3)>A(5)& A(3)>A(6) is: 2.7273e-006
A(4)>A(1)& A(4)>A(2)& A(4)>A(3)& A(4)>A(5)& A(4)>A(6) is: 2.7273e-006
A(5)>A(1)& A(5)>A(2)& A(5)>A(3)& A(5)>A(4)& A(5)>A(6) is: 0
A(6)>A(1)& A(6)>A(2)& A(6)>A(3)& A(6)>A(4)& A(6)>A(5) is: 0.066671



3. The order of fuzzy numbers, from min to max.

Next consider example4 and find the final ranking for the set $S = \{\overline{A}_1, \overline{A}_2, \overline{A}_3, \overline{A}_4\}$. If $v(\overline{A}_2 > \overline{A}\ ) > 0$ then max= $\overline{A}_2$, and if $v(\overline{A} > \overline{A}_2)$ >0, then max = $\overline{A}$

Summary and conclusions

In this paper we were interested in using a fuzzy ordering to rank a finite set of fuzzy numbers from smallest to larges by use of the matlab software program. A fuzzy ordering assigns a number in [0, 1] to the comparisons $\overline{M} > \overline{N}$ and $\overline{M} \geq \overline{N}$ and ranking them with graph .

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A GRAPH THEORY OF ONE METHOD FOR FUZZY ORDERING AND RANKING OF FUZZY NUMBERS

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Keywords: fuzzy numbers; fuzzy ordering; fuzzy ranking

Abstract: In this paper we interested in determining the fuzzy ordering then ranking, from smallest to largest, of any finites set of fuzzy numbers by use of the MATLAB software program.

УДК 332

ПРАКТИЧЕСКОЕ ПРИМЕНЕНИЕ МАТЕМАТИЧЕСКИХ МЕТОДОВ ДЛЯ РЕШЕНИЯ ЗАДАЧ КАЛЕНДАРНОГО ПЛАНИРОВАНИЯ В МЕНЕДЖМЕНТЕ

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Ключевые слова: оптимизация, оптимальный план, календарный план, производство

Аннотация: В современном мире одной из приоритетных задач фирмы является минимизация издержек. Это может быть осуществлено, в частности, с помощью решения задач календарного планирования, позволяющих найти оптимальный план производства, учитывающий возможности производства, спрос на продукцию и разные способы удовлетворения спроса. Решение таких задач менеджерами компаний, позволит избежать обращения к услугам сторонних специалистов.

В условиях современной нестабильности экономики, растущей конкуренции и удорожания ресурсов перед менеджерами всех уровней остро встает вопрос об оптимизации всех видов деятельности предприятия. В менеджменте применяют огромное число методов, позволяющих снизить издержки в использовании материалов, организации рабочего времени, организации транспортировок и плана производства.

В данной статье рассматривается метод оптимизации плана производства (календарного планирования). Производство зависит от множества факторов, таких как стоимость ресурсов в определенный период времени, количество доступного труда, спрос на продукцию, а так же возможных затрат на хранение продукции. Продукцию