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Determinations of A Square Fuzzy Soft Matrices

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Abstract
In this paper we introduce fuzzy determinant ordering with fuzzy soft matrices using the structure of M_n (FS) the set of (nxn) fizzy determinant ordering with fuzzy soft matrices is introduce and also we introduce the concept of fuzzy determinant an partitions of M_n (FS), properties of fuzzy determinant ordering.

Keywords :*Soft set, fuzzy soft set (FSS), fuzzy soft Matrix (FSM), determinant of a square fuzzy soft matrix.*

I. Introduction

The concept of fuzzy set was introduce by Zabeh [8] in 1965. Jian Miao chen [2] introduced the fuzzy matrix partial ordering and generalized inverse. Bertoiuzza [1] introduced the distributivity of t – norm and t – conforms. In 1995, Ragab. M. Z and Emam E.G. [7] introduced the determinant and adjoint of a square fuzzy matrix. Meenakshi A.R and cokilavany R. [3] introduced the concept of fuzzy 2 normed linear spaces. Nagoorgani A and Kalyani G [5] introduced the fuzzy matrix m – ordering. Zhou Min na [9] introduced the characterizations of the minus ordering in fuzzy matrix set. In this paper, we introduce the concept of fuzzy determinant ordering with fuzzy soft matrices. The purpose of the introduction is to explain determinant ordering with fuzzy soft matrices and partitions of M_n (FS). In section 4, properties of determinant of ordering with fuzzy soft matrices.

II. Priliminaries

In this section, we recall some basic essential notion of fuzzy soft set theory and fuzzy soft matrices 2.1 soft set [13].Let U be an initial set and E be a set of parameters. Let P(U) denotes the power set of U. let A≤E. A pair (F_A, E) is called a soft set over U, where F_A is a mapping given by F_A:E→P(U). such that $F_A(e)$=Φ if e ∉ A.Here F_A is called approximate fraction of the soft set (F_A,E). The set $F_A(e)$ is called e – approximate value set which consist of related objects of the parameter e€F. In other words, a soft set over U is a parameterized family of subsets of the universe U.

Example 2.1

Let U = {u1,u2,u3,u4} be a set of four shirts and E = {blue (e1), green (e2), yellow (e3)} be a set of parameters if A = {e1,e3} C E. Let F_A (e1) = {u1,u3,u4} amd F_A(e3) ={u2,u2,u4} then we write the soft set (F_A,E) = {(e1,{u1,u3,u4}), (e3,{u1,u2,u4})} over U which describe the “Colour of the shirts” which M_r X is going to buy.

We may represent the soft set in the following form.

U	Blue(e1)	Green(e2)	Yellow(e3
U_1	1	0	1
U_2	0	0	1
U_3	1	0	0
U_4	1	0	1

Table : 2.1.1

2.2 FUZZY SOFT SET [12]

Let U be an initial universe set and E be a set of parameters. Let P(U) denotes the set of all fuzzy sets of U. Let ACE. A pair (F_A,E) is called a fuzzy soft set (FSS) over U, where F_A is a mapping given by F_A : E → P(U) such that F_A € = Φ if e ∉A, Φ is a null fuzzy set.

Example 2.2

Consider the example 2.1 here we cannot express with only two real numbers 0 and 1, we can characterized it by a memberships function instead of crisp number 0 and 1, which associate with each element a real number in the interval [0,1] then.

(F_A,E) = { F_A(e1) = {(u1,0.3), (u2,0.9), (u3,0.4), (u4,0.7)},

F_A (e3) = {(u1,0.5), (u2,0.6), (u4,0.8)}} is the fuzzy soft set representing the "Colour of the Shirts" which r-X is going to buy. We may represent the fuzzy soft set in the following form.

U	Blue(e1)	Green(e2)	Yellow(e3
U_1	0.3	0.0	0.5
U_2	0.9	0.0	0.6
U_3	0.4	0.0	0.0
U_4	0.7	0.0	0.8

Table 2.2

2.3. The complement of a fuzzy soft set [1]

The complement of a fuzzy soft set (F,A) is denoted by $(F,A)^c$ and is defined by

$(F,A)^c = (F^c,A)$ where, $F^c:A\rightarrow P(U)$ is mapping given by $F^c(\infty)=[F(\infty)]^c$ ¥∞€A.

2.4 Fuzzy Soft Matrices (FSM) (11)

Let (F_A,E) be a fuzzy soft set over U, then a subset of U X E is uniquely defined by R_A={(u,e)}; e€A, u € F_A€} which is called relation form of (F_A,E) the characteristic function of R_A is written by μ_{RA} : U X E → [0.1], where μ_{RA} (u,e) € [0.1] is the membership value of u €E for each e€U.

If $[\mu_{ij}] = \mu_{RA}(u_i,e_j)$, we can define a matrix

$$[\mu_{ij}]_{mxn} = \begin{vmatrix} \mu 11 & \mu 12 & \ldots & \mu 1n \\ \mu 21 & \mu 22 & \ldots & \mu 2n \\ \mu m1 & \mu m2 & \ldots & \mu mn \end{vmatrix}$$

which is called an mxn soft matrix of the soft set (F_A,E) over U.

therefore we can say that a fuzzy soft set (F_A,E) is coniquely characterized by the matrix $[\mu_{ij}]_{mxn}$ and both concepts are interchangeable.

The set mxn fuzzy soft matrices over U will be denoted by $FSM_{mx.}$

Example 2.3

Assume that U ={u1,u2,u3,u4,u5} is a universal set and E={e1,e2,e3,e4} is a set of an parameters.

If A C E ={e1,e2,e3,e4} and (F_1,E) ={ F(e1)= {(u1,0.3), (u2,0.4),(u3,0.6),(u4,0.7),(u5,0.5)}

F(e2)= {(u1,0.2),(u2,0.7),(u3,0.1),(u4,0.8),(u5,0.6)}

F(e3)= {(u1,0.1),(u2,0.3),(u3,0.5),(u4,0,4),(u5,0.9)}}

Then the fuzzy soft matrix $[\mu_{ij}]$can be written as

$$[\mu_{ij}]_{mxn} = \begin{bmatrix} 0.3 & 0.2 & 0.0 & 0.1 \\ 0.4 & 0.7 & 0.0 & 0.3 \\ 0.6 & 0.1 & 0.0 & 0.5 \\ 0.7 & 0.8 & 0.0 & 0.4 \\ 0.5 & 0.6 & 0.0 & 0.9 \end{bmatrix}$$

2.4 Definition 2.4 [15]

Let U ={c1,c2 …….cm} be the universal set and E be the set of parameters given by E={e1,e2,e3,….en}. let the set of all mxn fuzzy soft matrices over U be FSM_{mxn}. Let A, B€$FSM_{mxn.}$ Where $A=[a_{ij}]_{mxn}$, $a_{ij} = (\mu_{j1}c(i), \mu_{j2}c(i))$ and $B=[a_{ij}]_{mxn}$, $b_{ij}=(\lambda_{j1}c(i)),\lambda_{j2}c(i))$. To avoid degenerate case we assume that $\min(\mu_{j1}c(i),\lambda_{j1}c(i))\geq\max(\mu_{j2}c(i),\lambda_{j2}c(i))$ for all i and j. we define the operation "addition(+)" between, A+B=C, where $C=[c_{ij}]_{mxn}$, $c_{ij}=(\max(\mu_{j1}c(i),\lambda_{j1}c(i)), \min(\mu_{j2}c(i),\lambda_{j2}c(i))$. If $\mu_{j2}c(i) = \lambda_{j2}c(i) = 0$ ¥ i, j, then one definition reduce to A+B=C, where $C=[c_{ij}]_{mxn}$.

C_{ij} = (max(μ_{j1}c(i),λ_{j1}c(i)),min(0,0) (max(μ_{j1}c(i),λ_{j1}c(i), 0)

= max(μ_{j1}c(i),λ_{j1}c(i)), which is the define of addition(max) of two fuzzy matrice [2] in the usual sense three fuzzy reference is 0.

Definition : 2.5 [15]

Let A, B∈FSM_{mxn}. Let the corresponding membership value, matrices be $M_v(A)=[\{\rho(A_{ij}]_{mxn}$ and $M_v(B)=[\{\rho(B)_{ij}]_{mxn}$, i=1,2,3,….m; then j=1,2,3,……n. Then the score matrix ρ(A,B) would be defined as $\rho(A,B)=[\rho_{ij}]_{mxn}$ where $\rho_{ij} - \rho(A)_{ij} - \rho(B)_{ij}$.

III. Determinant of a fuzzy soft matrices

In this section, we start by introducing the nation of the determinant of a fuzzy soft matrices and we prove some properties. Also let S_n be the symmetric group on {1,2,3,….n}.

Definition: 3:1

Let $A=[\mu_{ij}]_{mxn}$ ∈FSM_{mxn} the determinant of A, denoted as det(A) or |A|, is defined as

$$|A| = \sum_{\pi \in Sn} \mu 1\pi(1)\mu 2\pi(2) \ldots\ldots \mu n\pi(n)$$

Where the summation is taken over all π of S_n.

Definition: 3:2

The determinant of the fuzzy soft matrix A of order 2 is denoted

$$|A| = \begin{vmatrix} (\mu 11c(1), (\mu 12c(1) & (\mu 21c(1), \mu 22c(1)) \\ (\mu 11c(2), (\mu 12c(2) & (\mu 21c(2), \mu 22c(2)) \end{vmatrix}$$

= [max{min(μ_{11}c(1), μ_{21}c(2))},min{max(μ_{21}c(1), μ_{22}c(2)), Max(μ_{22}c(1), μ_{12}c(2))}].

Definition: 3.3

The determinant of the fuzzy soft matrix B order 3 is given by

$$|B| = \begin{vmatrix} (\lambda 11c(1), \lambda 12c(1)) & (\lambda 21c(1)\lambda 22c(1)), & (\lambda 31c(1), \lambda 32c(1)) \\ (\lambda 11c(2), \lambda 12c(2)) & (\lambda 21c(2)\lambda 22c(2)), & (\lambda 31c(2), \lambda 32c(2)) \\ (\lambda 11c(3), \lambda 12c(3)) & (\lambda 21c(3)\lambda 22c(3)), & (\lambda 31c(3), \lambda 32c(3)) \end{vmatrix}$$

$$|B| = (\lambda 11c(1), \lambda 12c(1)) \begin{vmatrix} (\lambda 21c(2)\lambda 22c(2)) & (\lambda 31c(2), \lambda 32c(2)) \\ (\lambda 21c(3)\lambda 22c(3)) & (\lambda 31c(3), \lambda 32c(3)) \end{vmatrix}$$

$$+ (\lambda 21c(1), \lambda 22c(1)) \begin{vmatrix} (\lambda 11c(2), \lambda 12c(2)) & (\lambda 31c(3), \lambda 32c(2)) \\ (\lambda 11c(3), \lambda 12c(3)) & (\lambda 31c(3), \lambda 32c(3)) \end{vmatrix}$$

$$+ (\lambda 31c(1), \lambda 32c(1)) \begin{vmatrix} (\lambda 11c(2), \lambda 12c(2)) & (\lambda 21c(2)\ \lambda 22c(2)) \\ (\lambda 11c(3), \lambda 12c(3)) & (\lambda 21c(3)\ \lambda 22c(3)) \end{vmatrix}$$

=(λ_{11}c(1), λ_{12}c(1)) [max{min((λ_{21}c(2), λ_{31}c(3)), min((λ_{31}c(2), λ_{21}c(3))},

$\min\{\max(\lambda_{22}(2), \lambda_{32}c(3)), \max(\lambda_{32}c(2), \lambda_{22}c(3))\}]$

$+(\lambda_{21}c(1), \lambda_{22}c(1))$ [$\max\{\min((\lambda_{11}c(2), \lambda_{31}c(3)), \min((\lambda_{31}c(2), \lambda_{11}c(3))\},$

$\min\{\max(\lambda_{12}(2), \lambda_{32}c(3)), \max(\lambda_{32}c(2), \lambda_{12}c(3))\}]$

$+(\lambda_{31}c(1), \lambda_{32}c(1))$ [$\max\{\min((\lambda_{11}c(2), \lambda_{21}c(3)), \min((\lambda_{21}c(3), \lambda_{11}c(3))\},$

$\min\{\max(\lambda_{12}(2), \lambda_{22}c(3)), \max(\lambda_{22}c(2), \lambda_{13}c(3))\}]$

Definition: 3:1

Let U={c1,c2,c3} be the universal set and E be the set of parameter given by E={e1,e2,e3} consider the fuzzy soft set.

(F,E) ={F(e1) ={c(c1,0.3,0.0), c(c2,0.5,0.1), c(c3,0.6,0.3))},

F(e2) ={c(c1,0.7,0.1), c(c2,0.9,0.5), c(c3,0.7,0.1))},

F(e3) ={c(c1,0.6,0.2), c(c2,0.7,0.0), c(c3,0.7,0.2))}.

The fuzzy soft square matrix representing the fuzzy soft set is

$$A = \begin{vmatrix} (0.3,0.0) & (0.7,0.1) & (0.6,0.2) \\ (0.5,0.1) & (0.9,0.5) & (0.7,0.1) \\ (0.6,0.3) & (0.7,0.1) & (0.7,0.2) \end{vmatrix}$$

Then

$$|A| = (0.3,0.0)\begin{vmatrix} (0.9,0.5) & (0.7,0.0) \\ (0.7,0.1) & (0.7,0.2) \end{vmatrix} + (0.7,0.1)\begin{vmatrix} (0.5,0.1) & (0.7,0.0) \\ (0.6,0.3) & (0.7,0.2) \end{vmatrix}$$

$$+(0.6,0.2)\begin{vmatrix} (0.5,0.1) & (0.9,0.5) \\ (0.6,0.3) & (0.7,0.1) \end{vmatrix}$$

=(0.3,0.0) [max{min(0.9,0.7), min(0.7,0.7)}, min{max(0.5,0.2), max(0.0,0.1)}]

+(0.7,0.1)[max{min(0.5,0.7),min(0.7,0.6)}, min{max(0.1,0.2),max(0.0,0.3)}]

+(0.6,0.2)[max{min(0.5,0.7),min(0.9,0.6)}, min{max(0.1,0.1),max(0.5,0.3)}]

=(0.3,0.0)(0.7,0.1)+(0.7,0.1)(0.6,0.2)+(0.6,0.2)(0.6,0.1)

=[max{min(0.3,0.7)}, min{max(0.0,0.1)}]+max{min(0.7,0.6)},

min{max(0.1,0.2)}+[max{min(0.6,0.6),min{max(0.2,0.1)}] .

= (0.3,0.1)+(0.6,0.1)+(0.6,0.2)

= max(0.3,0.6,0.6)+min(0.1,0.1,0.2)

|A| = (0.6,0.1)

Proportion:3.1

Let $A \in FSM_{nxn}$ then det A=detA^T

Proof:

Let $A \in FSM_{2x2}$ we write as

$$A = \begin{vmatrix} (\mu 11c(1), \mu 12c(1)) & (\mu 21c(1), \mu 22c(1)) \\ (\mu 11c(2), \mu 12c(2)) & (\mu 21c(2), \mu 22c(2)) \end{vmatrix}$$

$$A^T = \begin{vmatrix} (\mu 11c(1), \mu 12c(1)) & (\mu 11c(2), \mu 12c(2)) \\ (\mu 21c(2), \mu 22c(2)) & (\mu 21c(2), \mu 22c(2)) \end{vmatrix}$$

det A^T = [max{min(μ_{11}c(1), μ_{12}c(2)), min(μ_{11}c(2), μ_{21}c(1))}

Min{max(μ_{12}c(1), μ_{22}c(2)),max(μ_{12}c(2), μ_{22}c(1))}

= [max{min((μ_{11}c(1), μ_{21}c(2)),min((μ_{21}c(1), μ_{11}c(2))},

Min{(μ_{12}c(1), μ_{22}c(2)), max(μ_{22}c(1), μ_{12}c(2))}]

=det[A].

Example : 3.2:

$$\text{Let } A = \begin{vmatrix} (0.8,0) & (0.3,0) & (0.2,0) \\ (0.6,0) & (0.9,0) & (0.6,0) \\ (0.1,0) & (0.7,0) & (0.7,0) \end{vmatrix}$$

$$A^T = \begin{vmatrix} (0.8,0) & (0.6,0) & (0.1,0) \\ (0.3,0) & (0.9,0) & (0.7,0) \\ (0.2,0) & (0.6,0) & (0.7,0) \end{vmatrix}$$

$$\det[A] = (0.8,0)\begin{vmatrix} (0.9,0) & (0.6,0) \\ (0.7,0) & (0.7,0) \end{vmatrix} + (0.3,0)\begin{vmatrix} (0.6,0) & (0.6,0) \\ (0.1,0) & (0.7,0) \end{vmatrix} + (0.2,0)\begin{vmatrix} (0.6,0) & (0.9,0) \\ (0.1,0) & (0.7,0) \end{vmatrix}$$

= (0.8,0)[(0.7,0)+(0.6,0)] + (0.30)[(0.6,0)+(0.1,0)] + (0.2,0)[(0.6,0)+(0.1,0)]

= (0.7,0) + (0.3,0) + (0.2,0)

det[A]= (0.7,0)

$$\det A^T = \begin{vmatrix} (0.8,0) & (0.6,0) & (0.1,0) \\ (0.3,0) & (0.9,0) & (0.6,0) \\ (0.1,0) & (0.7,0) & (0.7,0) \end{vmatrix}$$

$$(0.8,0)\begin{vmatrix}(0.9,0) & (0.6,0)\\(0.7,0) & (0.7,0)\end{vmatrix} + (0.6,0)\begin{vmatrix}(0.3,0) & (0.6,0)\\(0.1,0) & (0.7,0)\end{vmatrix} + (0.1,0)\begin{vmatrix}(0.3,0) & (0.9,0)\\(0.1,0) & (0.7,0)\end{vmatrix}$$

= (0.8,0)[(0.7,0)+(0.6,0)] + (0.60)[(0.3,0)+(0.1,0)] + (0.1,0)[(0.3,0)+(0.1,0)]

= (0.7,0) + (0.3,0) + (0.1,0)

det A^T = (0.7,0)

.: hence $\det[A]^T = \det[A]$

Proposition : 3.2

Let a€FSM, then det[aA] = a det[A]

Proof :

Let a€FSM, and $A = [\mu_{ij}]$ €FSM_{2x2}

$$\det[aA] = \begin{vmatrix}a(\mu11(c1),\mu12(c1)) & a(\mu11(c2),\mu12(c2))\\a(\mu21(c1),\mu22(c1)) & a(\mu21(c2),\mu22(c2))\end{vmatrix}$$

$$= a \begin{vmatrix}(\mu11(c1),\mu12(c1)) & (\mu11(c2),\mu12(c2))\\(\mu21(c1),\mu22(c1)) & (\mu21(c2),\mu22(c2))\end{vmatrix}$$

= a det[A]

Example 3:3

$$\text{if} \quad A=\begin{vmatrix}0.8 & 0.3 & 0.2\\0.6 & 0.9 & 0.6\\0.1 & 0.7 & 0.7\end{vmatrix}$$

$$\det[A] = 0.8\begin{vmatrix}0.9 & 0.6\\0.7 & 0.7\end{vmatrix} + 0.3\begin{vmatrix}0.6 & 0.6\\0.1 & 0.7\end{vmatrix} + 0.2\begin{vmatrix}0.6 & 0.9\\0.1 & 0.7\end{vmatrix}$$

= 0.8 [0.7 +0.6] + 0.3[0.6+0.1] + 0.2[0.6+0.1]

= 0.7 + 0.3 + 0.2

det[A]= 0.7

Set a = 0.5

$$aA=0.5\begin{vmatrix}0.8 & 0.3 & 0.2\\0.6 & 0.9 & 0.6\\0.1 & 0.7 & 0.7\end{vmatrix}$$

$$aA \quad \begin{vmatrix} 0.5 & 0.3 & 0.2 \\ 0.5 & 0.5 & 0.5 \\ 0.1 & 0.5 & 0.5 \end{vmatrix}$$

det[aA] = 0.5(0.5) + 0.3 + 0.2(0.5)

det[aA]= 0.5

a det[A] = (0.5)(0.7) = 0.5

hence |aA|= a|A| = 0.5

(or) det[aA] = a det[A]

IV. Properties of Determinant ordering with fuzzy soft matrices

Definition 4.1

The determinant ordering A ≤ B in M_n(Fs) is defined ad Ã≤B̃⇔ det[Ã]≤det[B̃]. (or) A≤ B̃⇔ | Ã| ≤ | B̃|.

Example 4:1

$$\text{Let } \tilde{A}= \begin{vmatrix} (0.5,0.1) & (0.4,0.2) & (0.6,0.2) \\ (0.5,0.1) & (0.4,0.2) & (0.6,0.2) \\ (0.5,0.2) & (0.2,0.1) & (0.5,0.1) \end{vmatrix}$$

$$\text{a and } \tilde{B} = \begin{vmatrix} (0.7,0.2) & (0.6,0.3) & (0.8,0.4) \\ (0.4,0.5) & (0.5,0.3) & (0.6,0.4) \\ (0.8,0.3) & (0.6,0.2) & (0.7,0.3) \end{vmatrix}$$

det[Ã]= (0.5,0.1) [max(0.1,0.2), min(0.2,0.3)] +

(0.4,0.2)[max(0.3,0.4),min(0.3,0.3)] +

(0.6,0.2)[max(0.2,0.1),min(0.2,0.3)]

= (0.5,0.1) (0.2,0.2) + (0.4,0.2) (0.4,0.3) + (06,0.2) (0.2,0.2)

= (0.2,0.2) + (0.4,0.3) + (0.2,0.2)

det[Ã]= (0.4,0.2)

det[B̃] = (0.7,0.2) [max(0.5,0.6),min(0.3,0.4)] +

(0.6,0.3) [max(0.4,0.6),min(0.5,0.4)] +

(0.8,0.4)[max(0.4,0.5), min(0.5,0.3)]

=(0.7,0.2) (0.6,0.3) + (0.6,0.3) (0.6,0.4) + (0.8,0.4) (0.5,0.3)

=(0.6,0.3) + (0.6,0.4) + (0.5,0.4)

det[B̃]= (0.6,0.3)

Hence A≤B ⇔ det [A] ≤ det[B].

Theorem 4.1
The determinant ordering is not a partial ordering.

Proof:

(i) det[Ã] = det[B̃] for all Ã∈ M_n (FS)
Hence Ã ≤ B̃
.: reflexivity is true.

(ii) Ã≤B̃=> det[Ã] ≤ det[B̃],
B̃≤ Ã => det[B̃] ≤ det[Ã],.
Ã≤ B̃ and B̃≤ Ã => det [Ã] = det[B̃].

But det[Ã] = det[B̃]

.: does not imply Ã= B̃

.: Anti Symmetry is not true.

(iii) Ã≤ B̃, B̃≤C =>Ã≤C for all Ã, B̃,C ∈M_n(Fs)
For Ã≤ B̃ => det[Ã] ≤ det[B̃]
B̃ ≤ C => det[B̃] ≤ det [C]
Ã≤C => det[Ã] ≤ det[C]
.: transitivity is true.

Thus the determinant ordering is not a partial ordering in M_n(Fs)

Example 4.2

$$\text{Let } \tilde{A} = \begin{vmatrix} (0.5,0.1) & (0.4,0.2) & (0.6,0.2) \\ (0.3,0.3) & (0.1,0.2) & (0.4,0.3) \\ (0.5,0.2) & (0.2,0.1) & (0.5,0.1) \end{vmatrix}$$

$$\tilde{B} = \begin{vmatrix} (0.7,0.2) & (0.6,0.3) & (0.8,0.4) \\ (0.4,0.5) & (0.5,0.3) & (0.6,0.4) \\ (0.8,0.3) & (0.6,0.2) & (0.7,0.3) \end{vmatrix}$$

$$\text{and } C = \begin{vmatrix} (0.8,0.3) & (0.6,0.4) & (0.8,0.5) \\ (0.5,0.6) & (0.9,0.4) & (0.7,0.5) \\ (0.8,0.4) & (0.6,0.4) & (0.8,0.5) \end{vmatrix}$$

det[Ã] = (0.4,0.2), det[B̃] = (0.6,0.3)

det[C] = (0.8,0.3) (0.8,0.5) + (0.6,0.4) (0.7,0.5) + (0.8,0.5) (0.5,0.4)

= (0.8,0.5) + (0.6,0.5) + (0.5,0.5)

= (0.8,0.5)

(i) det[Ã] ≤det[Ã] for all ÃЄM_n(Fs), Ã≤ Ã,

.: reflexivity is true.

(ii) Ã≤ B̃ => det[Ã] ≤ det[B̃] = (0.4,0.2) ≤ (0.6,0.3)

B̃≤ Ã => det[B̃] ≤ det[Ã] = (0.6,0.3) ≤ (0.4,0.2)

Ã≤ B̃ and B̃≤ Ã => det[Ã] = det[B̃]

But det[Ã] = det[B̃] does not imply Ã= B̃

.: Anti symmetry is not true

(iii) Ã≤ B̃ = det[Ã] ≤ det[B̃] = (0.4,0.2) ≤ (0.6,0.3)

B̃≤C = det[B̃] ≤det[C̃] = (0.6,0.3) ≤ (0.8,0.5)

Ã≤C = det[Ã] ≤ det[C] = (0.4,0.2) ≤ (0.8,0.5)

.: Transitivity is true.

Thus the determinant ordering is not a partial ordering in M_n(Fs).

V. Conclusion

In this paper, we introduce definition of determinant on fuzzy soft matrix and its properties are discussed. Numerical examples are given to clarity the developed theory and the proposed determinant of a square fuzzy soft matrices.

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