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A NEW PROPOSED METHOD FOR SOLVING INTUITIONISTIC FUZZY PARAMETRIC LINEAR COMPLIMENTARITY PROBLEMS

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Abstract:

In this paper, a new approach for solving the Fuzzy Linear Complimentarity Problem (FLCP) is suggested. Here, the cost coefficients, constrained coefficients and the right hand side coefficients are represented by Intuitionistic triangular fuzzy numbers. Using the KKT conditions and the implementation of the complementary pivot method using the inverse of the basis is proposed to solve the Intuitionistic Fuzzy Linear Complementarity Problems (FLCP). The effectiveness of the proposed method is illustrated by means of an example.

Key Words*:* Fuzzy Linear Complementarity Problem, Intuitionistic Triangular Fuzzy Numbers & Implementation of the Complementary Pivot Method Using the Inverse of the Basis

1. Introduction:

Many practical problems cannot be represented by linear programming model. Therefore, attempts were made to develop more general mathematical programming methods and many significant advances have been made in the area of nonlinear programming. The first major development was the fundamental paper by Kuhn-Tucker in 1951[3] which laid the foundations for a good deal of later work in nonlinear programming. The linear complementarity problem (LCP) is a well known problem in mathematical programming and it has been studied by many researchers. In 1968, Lemke [3] proposed a complementarity pivoting algorithm for solving linear complementarity problems. Since, the KKT conditions for quadratic programming problems can be written as a LCP, Lemke's algorithm can be used to solve quadratic programs. Since then the study of complementarity problems has been expanded enormously. Also, iterative methods developed for solving LCPs hold great promise for handling very large scale linear programs which cannot be tackled with the well known simplex method because of their large size and the consequent numerical difficulties. In a recent review, Pankaj Gupta et al [4] gave a fuzzy approximation to an infeasible generalized linear complementarity problem. This paper provides a new technique for solving Intuitionistic fuzzy linear complementarity problem by implementation of the complementary pivot method using the inverse of the basis

2. Preliminaries:

2.1 Fuzzy Set: A Fuzzy set Ã is defined by Ã = {x,μA(x)}; x€A, μA(x)€[0,1]. In the pair (x, μA(x)),the first element x belong to the classical set A,the second element μA(x),belong to the interval [0,1] called membership function.

2.2 Intuitionistic Fuzzy Set: An Intuitionstic fuzzy set a assign the each element x of the universe X a membership degree $\mu_{a}(x)$ ∊ [0,1] and non membership degree $\upsilon_{a}(x)$ ∊ [0,1] such that $\mu_{a}(x)+\upsilon_{a}(x) \leq 1$. An IFS a is mathematically represented as {<x, $\mu_{a}(x)$, $\upsilon_{a}(x)$> x €X}

2.3 Intuitionistic Triangular Fuzzy Number: A triangular intuitionistic fuzzy number (TIFN) $\tilde{A}^I$ is an intuitionistic fuzzy set in R with the following membership function $\mu_{\tilde{A}^I}(x)$ and non-membership function $\vartheta_{\tilde{A}^I}(x)$

$$\mu_{\tilde{A}^I}(x)=\begin{cases}\frac{x-a_1}{a_2-a_1}, & a_1\leq x\leq a_2\\ \frac{x-a_3}{a_2-a_3}, & a_2\leq x\leq a_3\\ 0, & otherwise\end{cases} \quad \text{and} \quad \vartheta_{\tilde{A}^I}(x)=\begin{cases}\frac{a_2-x}{a_2-a_1'}, & a_1'\leq x\leq a_2\\ \frac{x-a_2}{a_3'-a_2}, & a_2\leq x\leq a_3'\\ 1, & otherwise\end{cases}$$

Where $a_1'\leq a_1\leq a_2\leq a_3\leq a_3'$ and $\mu_{\tilde{A}^I}(x)+\vartheta_{\tilde{A}^I}(x)\leq 1$ or $\mu_{\tilde{A}^I}(x)=\vartheta_{\tilde{A}^I}(x)$, for all $x\in$ R . This TIFN is denoted by $\tilde{A}^I = (a_1,a_2,a_3;\ a_1',a_2,a_3') = \{(a_1,a_2,a_3);(a_1',a_2,a_3')\}$

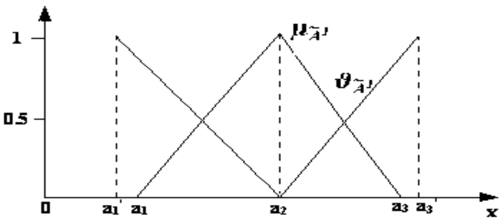

Figure 1: Membership and non-membership functions of TIFN

2.4 Positive Triangular Intuitionistic Fuzzy Number: A positive triangular intuitionistic fuzzy number is denoted as $\{(a_1,a_2,a_3);(a_1',a_2,a_3')\}$where all a_i's anda_i''s >0 for all i=1, 2, 3.

2.5 Negative Triangular Intuitionistic Fuzzy Number: A negative triangular intuitionistic fuzzy number is denoted as $\{(a_1,a_2,a_3);(a_1',a_2,a_3')\}$where all a_i's and a_i''s <0 for all i=1, 2, 3.

2.6 Modified Operations of Triangular Intuitionistic Fuzzy Numbers Using Function Principle: The following are the modified operations that can be performed on triangular intuitionistic fuzzy numbers:

Let $\tilde{A}^I = \{(a_1, a_2, a_3); (a_1', a_2, a_3')\}$ and $\tilde{B}^I = \{(b_1, b_2, b_3); (b_1', b_2, b_3')\}$.

Then

Addition: $\tilde{A}^I + \tilde{B}^I = \{(a_1 + b_1, a_2 + b_2, a_3 + b_3); (a_1' + b_1', a_2 + b_2, a_3' + b_3')\}$

Subtraction: $\tilde{A}^I - \tilde{B}^I = \{(a_1 - b_3, a_2 - b_2, a_3 - b_1); (a_1' - b_3', a_2 - b_2, a_3' - b_1')\}$

Multiplication: $\tilde{A}^I \text{ X } \tilde{B}^I = \{(\min(a_1b_1, a_1b_3, a_3b_1, a_3b_3), a_2b_2, \max(a_1b_1, a_1b_3, a_3b_1, a_3b_3)$

$(\min(a_1'b_1', a_1'b_3', a_3'b_1', a_3'b_3'), a_2b_2, \max(a_1'b_1', a_1'b_3', a_3'b_1', a_3'b_3')\}$

Division: $\tilde{A}^I / \tilde{B}^I = \{(\min(\frac{a_1}{b_1}, \frac{a_1}{b_3}, \frac{a_3}{b_1}, \frac{a_3}{b_3}), \frac{a_2}{b_2}, \max(\frac{a_1}{b_1}, \frac{a_1}{b_3}, \frac{a_3}{b_1}, \frac{a_3}{b_3}));$

$(\min(\frac{a_1'}{b_1'}, \frac{a_1'}{b_3'}, \frac{a_3'}{b_1'}, \frac{a_3'}{b_3'}), \frac{a_2}{b_2}, \max(\frac{a_1'}{b_1'}, \frac{a_1'}{b_3'}, \frac{a_3'}{b_1'}, \frac{a_3'}{b_3'}))\}$

2.7 Example: Let $\tilde{A}^I = \{(2,4,6); (1,4,7)\}$ and $\tilde{B}^I = \{(1,2,3); (0.5,2,3.5)\}$

Then (i) $\tilde{A}^I + \tilde{B}^I = \{(3,6,9);(1.5,6,10.5)\}$

(ii) $\tilde{A}^I - \tilde{B}^I = \{(-1,2,5);(-2.5,2,6.5)\}$

(iii) $\tilde{A}^I X \tilde{B}^I = \{(2,8,18);(0.5,8,24.5)\}$

(iv) $\tilde{A}^I / \tilde{B}^I = \{(0.6,2,6);(0.286,2,14)\}$

(v) $\tilde{A}^I / \tilde{A}^I = \{(0.333,1,3);(0.143,1,7)\}$

2.8. Graded Mean Integration Method: Suppose $\tilde{A} = (a_1, a_2, a_3)$ is a given triangular fuzzy number. Then the defuzzification of the fuzzy number by graded mean integration method is $p(\tilde{A}) = \frac{(a_1 + 4a_2 + a_3)}{6}$.

2.9. New Operation on Intuitionistic Triangular Fuzzy Number Subtraction: Let $\tilde{A}^I = \{(a_1, a_2, a_3); (a_1', a_2, a_3')\}$ and $\tilde{B}^I = \{(b_1, b_2, b_3); (b_1', b_2, b_3')\}$ Then $\tilde{A}^I - \tilde{B}^I = \{(a_1 - b_1, a_2 - b_2, a_3 - b_3); (a_1' - b_1', a_2 - b_2, a_3' - b_3')\}$.

The new subtraction operation exists only if the following conditionsare satisfied $D(\tilde{A}^I) \geq D(\tilde{B}^I)$ and $D(\tilde{A}^{I'}) \geq D(\tilde{B}^{I'})$, where $D(\tilde{A}^I) = \frac{a_3 - a_1}{2}$, $D(\tilde{B}^I) = \frac{b_3 - b_1}{2}$,

$D(\tilde{A}^{I'}) = \frac{a_3' - a_1'}{2}$ and $D(\tilde{B}^{I'}) = \frac{b_3' - b_1'}{2}$ .Here D denotes difference point of a intuitionistic triangular fuzzy number.

Division: Let $\tilde{A}^I = \{(a_1, a_2, a_3); (a_1', a_2, a_3')\}$ and $\tilde{B}^I = \{(b_1, b_2, b_3); (b_1', b_2, b_3')\}$.Then $\tilde{A}^I / \tilde{B}^I = \{(\frac{a_1}{b_1}, \frac{a_2}{b_2}, \frac{a_3}{b_3}); (\frac{a_1'}{b_1'}, \frac{a_2}{b_2}, \frac{a_3'}{b_3'})\}$. The new division operator exists only if the following conditions are satisfied $\left|\frac{D(\tilde{A}^I)}{M(\tilde{A}^I)}\right| \geq \left|\frac{D(\tilde{B}^I)}{M(\tilde{B}^I)}\right|$; $\left|\frac{D(\tilde{A}^{I'})}{M(\tilde{A}^{I'})}\right| \geq \left|\frac{D(\tilde{B}^{I'})}{M(\tilde{B}^{I'})}\right|$ and the negative triangular intuitionistic fuzzy number should be changed into negative multiplication of positive triangular intuitionistic fuzzy number.

3. Fuzzy Number Linear Complementarity Problem (FLCP):

3.1. Fuzzy Linear Complementarity Problem (FLCP): Assume that all parameters in (1) - (3) are fuzzy and are described by fuzzy numbers. Then, the following fuzzy linear complementarity problem can be obtained by replacing crisp parameters with fuzzy numbers.

$$\tilde{W} - \tilde{M}\tilde{Z} = \tilde{q} \quad (1)$$

$$\tilde{W}_j \geq 0, \tilde{Z}_j \geq 0, \; j = 1, 2, 3, \ldots\ldots\ldots. n \quad (2)$$

$$\tilde{W}_j \tilde{Z}_j = 0, \; j = 1, 2, 3, \ldots\ldots\ldots\ldots n \quad (3)$$

The pair $(\tilde{W}_j, \tilde{Z}_j)$ is said to be a pair of fuzzy complementary variables.

Definition 3.2: A solution $(\tilde{W}, \tilde{Z})$ to the above system (1) - (3) is called a fuzzy complementary feasible solution, if $(\tilde{W}, \tilde{Z})$ is a fuzzy basic feasible solution to (1) and (2) with one of the pair $(\tilde{W}_j, \tilde{Z}_j)$ basic for each j =1, 2, 3…n.

4. Implementation of the Complementary Pivot Method Using the Inverse of the Basis for Solving Fuzzy Linear Complementarity Problem:

Step 1: Introduce the fuzzy artificial variable associated $\tilde{z}^I{}_0$ with the column vector I_t for the purpose of obtaining a feasible basis.

Step 2: Identify row t such that $\tilde{q}_t{}^I$ = minimum $\{\tilde{q}_i{}^I \; ; 1 \leq i \leq n$. Break ties for t in this equation arbitrarily. Since we assumed $\tilde{q}_t{}^I < 0$. When a pivot is made with the column vector of $\tilde{z}^I{}_0$ as the pivot column and the t^th row as the pivot row, the right hand side constant vectors becomes a non negative vector. Therefore, here the initial basic vector is $(\tilde{W}_1{}^I, \ldots\ldots\ldots \tilde{W}_{t-1}{}^I, \tilde{z}_0{}^I, \tilde{W}_{t+1}{}^I, \ldots. \tilde{W}_n{}^I)$

Step 3: After performing the pivot with row t as the pivot row and the column vector $\tilde{z}^I{}_0$ of as the pivot column, we get the initial tableau for this algorithm.

Step 4: Let P_0 be the pivot matrix of order n obtained by replacing the t^{th} column in I (the unit matrix of order n) by $-e_n$ (the column vector in R_n all of whose entries are -1). Let M' = P_0 M, q' = $P_0 \tilde{q}^I$. Then the initial tableau in this algorithm is

$\tilde{W}^I$	$\tilde{z}^I$	$\tilde{z}^I_0$	
P_o	$-M'$	$I_{.t}$	$\tilde{q}^I$

The Initial Basic Vector is $(\tilde{W}^I_1 ,\ldots\ldots\ldots \tilde{W}^I_{t-1}, \tilde{z}^I_0, \tilde{W}^I_{t+1}, \ldots. \tilde{W}^I_n)$

Step 5: Let B be the basis from (4.1), corresponding to the present basic Vector. Let $\beta = \beta_{ij} = B^{-1}$ Let β = ($_{ij}$) = B^{-1} and $\tilde{q}^I = B^{-1} q^1$ and $\tilde{\bar{q}} = B^{-1} q^1$. Then the inverse Tableau is

Basic Vector	Inverse	
	$\beta = \beta_{ij} = B^{-}$	$\tilde{q}^I$

Step 6: To find the entering variable. The updated column of $\tilde{Y}s^I$ is $\beta P_0 I_{.s}$ if $\tilde{Y}s^I = \tilde{W}^I_s$

Suppose this pivot column is $(\tilde{a}^I_{1s} ,\ldots\ldots\ldots .\tilde{a}^I_{ns})^T \leq 0$. We have ray termination and the method has been unable to solve this IFLCP. Otherwise go to next step.

Step 7: To find the leaving variable. The minimum ratio is $\theta = \min \left\{ \frac{\tilde{q}^I_i}{\tilde{a}^I_{is}} \; i ; \tilde{a}^I_{is} \geq 0 \right.$

If the i that attains this minimum is unique, it determines the pivot row uniquely. The present basic variable in the pivot row is the leaving variable. Suppose i do not uniquely, check whether $\tilde{z}^I_0$ is eligible to drop and if so choose it as the leaving variable. If $\tilde{z}^I_0$ is not eligible to drop, we can be choosen arbitrarily. Once the leaving variable is identified, performing the pivot leads to the next basis inverse, and the entering variable in the next step is the complement of the leaving variable, and the method is continued in the same way.

4. Illustrative Example:

Consider the LCP **(**$\tilde{q}$, $\tilde{M}$) with intuitionistic triangular fuzzy number is

$$\tilde{M}^I = \begin{bmatrix} \tilde{1}^I & \tilde{0}^I & \tilde{0}^I \\ \tilde{2}^I & \tilde{1}^I & \tilde{0}^I \\ \tilde{2}^I & \tilde{2}^I & \tilde{1}^I \end{bmatrix} \text{ and } \tilde{q}^I = \begin{bmatrix} \tilde{6}^I \\ \tilde{2}^I \\ \tilde{14}^I \end{bmatrix}$$

For solving the above Intuitionistic fuzzy Linear Complimentarity problem($\tilde{q}$,$\tilde{M}$) by Implementation of the Complementary Pivot Method Using the Inverse of the Basis

Table 1

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{z}^I_3$	Ratio
$\tilde{W}^I_1$	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(0,0,0); (0,0,0)}	{(3,6,9); (2.778,6,9.35)}	{(1,1,1); (.5,1,1.5)}	{(3,6,9); (2.778,6,9.35)}
$\tilde{W}^I_2$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}	**{(1, 1, 1); (.5, 1, 1.5)}**	{(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_0$	{(0,0,0); (0,0,0)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(13,14,15); (12.8,14,15.92)}	{(1,1,1); (.5,1,1.5)}	{(13,14,15); (12.8,14,15.92)}

Table 2

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{z}^I_2$	Ratio
$\tilde{W}^I_1$	{(1,1,1); (.5,1,1.5)}	-{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(3,4,5); (2.79,4,5.8)}	{(1,1,1); (.5,1,1.5)}	{(3,4,5); (2.79,4,5.8)}
$\tilde{z}^I_1$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_0$	{(0,0,0); (0,0,0)}	-{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(11,12,13); (10.9,12,13.81)	{(1,1,1); (.5,1,1.5)}	{(11,12,13); (10.9,12,13.81)}

Table 3

Initial Basic Vector	$\tilde{W}^I_1$	$\tilde{W}^I_2$	$\tilde{W}^I_3$	$\tilde{z}^I_1$	$\tilde{z}^I_2$	$\tilde{z}^I_3$	$\tilde{z}^I_0$	$\tilde{q}^I$
$\tilde{W}^I_1$	{(1,1,1); (.5,1,1.5) }	{(0,0,0); (0,0,0)}	-{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(3,6,9); (2.778,6,9.35)}

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$\tilde{W}^I_2$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5) }	-{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_0$	{(0,0,0); (0,0,0)}	{(0,0,0); (0,0,0)}	-{(1,1,1); (.5,1,1.5)}	{(1,2,3); (.5,2,3.5)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(13,14,15); (12.8,14,15.92)}

Table 4

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{w}^I_3$	Ratio
$\tilde{W}^I_1$	{(1,1,1); (.5,1,1.5)}	-{(-1,2,3); (.5,2,3.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_2$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}	-{(1,1,1); (.5,1,1.5)}	-
$\tilde{z}^I_0$	{(0,0,0); (0,0,0)}	-{(-1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(9,10,11); (8.25,10,11.7)}	{(1,1,1); (.5,1,1.5)}	{(9,10,11); (8.25,10,11.7)}

Table 5

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{z}^I_1$	Ratio
$\tilde{W}^I_3$	{(1,1,1); (.5,1,1.5)}	-{(-1,2,3); (-1,2,3.5)}	{(0,0,0); (0,0,0)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_2$	{(1,1,1); (.5,1,1.5)}	-{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(3,4,5); (2.5,4,5.6)}	{(1,1,1); (.5,1,1.5)}	{(3,4,5); (2.5,4,5.6)}
$\tilde{z}^I_0$	-{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(7,8,9); (6.7,8,9.9)	{(1,1,1); (.5,1,1.5)}	{(7,8,9); (6.7,8,9.9)

Table 6

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{z}^I_3$	Ratio
$\tilde{z}^I_1$	{(1,1,1); (.5,1,1.5)}	-{(1,2,3); (.5,2,3.5)}	{(0,0,0); (0,0,0)}	(1,2,3); (.5,2,3.5)}	−{(1,1,1); (.5,1,1.5)}	-
$\tilde{z}^I_2$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	(1,2,3); (.5,2,3.5)}	{(**1**, **1**, **1**); (.**5**, **1**, **1.5**)**}**	(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_0$	-{(1,2,3); (.5,2,3.5)}	{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(5,6,7); (4.7,6,7.9)}	{(1,1,1); (.5,1,1.5)}	{(5,6,7); (4.7,6,7.9)}

Table 7

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{w}^I_2$	Ratio
$\tilde{z}^I_1$	{(1,1,1); (.5,1,1.5)}	−{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(3,4,5); (2.5,4,5.6)}	−{(1,1,1); (.5,1,1.5)}	-
$\tilde{z}^I_3$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	(1,2,3); (.5,2,3.5)}
$\tilde{z}^I_0$	-{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(3,4,5); (2.5,4,5.6)}	{(1,1,1); (.5,1,1.5)}	{(3,4,5); (2.5,4,5.6)}

Table 8

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column $\tilde{w}^I_3$	Ratio
$\tilde{z}^I_1$	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(0,0,0); (0,0,0)}	{(5,6,7); (4.7,6,7.9)}	−{(1,1,1); (.5,1,1.5)}	-
$\tilde{w}^I_2$	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	(1,2,3); (.5,2,3.5)}	−{(1,1,1); (.5,1,1.5)}	-
$\tilde{z}^I_0$	-{(1,2,3); (.5,2,3.5)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	(1,2,3); (.5,2,3.5)}

Table 9

Basic vector	Inverse			$\tilde{q}^I$	Pivot Column	Ratio
$\tilde{z}^I_1$	−{(1,1,1); (.5,1,1.5)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	{(7,8,9); (6.7,8,9.9)		
$\tilde{w}^I_2$	-{(1,2,3); (.5,2,3.5)}	{(1,1,1); (.5,1,1.5)}	{(1,1,1); (.5,1,1.5)}	{(3,4,5); (2.5,4,5.6)}		
$\tilde{w}^I_3$	-{(1,2,3); (.5,2,3.5)}	{(0,0,0); (0,0,0)}	{(1,1,1); (.5,1,1.5)}	(1,2,3); (.5,2,3.5)}		

The Solution of the Intuitionistic fuzzy linear complimentarity is

$$\tilde{w}^I_1 = \{(0,0,0); \quad (0,0,0)\}$$

$$\tilde{w}_2^{\,I} = \{(3,4,5); \quad (2.5,4,5.6 \quad)\}$$

$$\tilde{w}_3^{\,I} = (1,2,3); \quad (.5,2,3.5) \quad \}$$

$$\tilde{z}_1^{\,I} = \{(7,8,9); \quad (6.7,8,9.9 \quad)$$

$$\tilde{z}_2^{\,I} = \{(0,0,0); \quad (0,0,0)\}$$

$$\tilde{z}_3^{\,I} = \{(0,0,0); \quad (0,0,0)\}$$

Conclusion:

In this paper, a new approach for solving an Intuitionistic fuzzy linear complementarity problem is suggested. Here, the implementation of the complementary pivot method using the inverse of the basis is proposed to solve the given fuzzy linear complementarity problem with the intuitionistic triangular fuzzy number gives the optimal solution of the given objective function.

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