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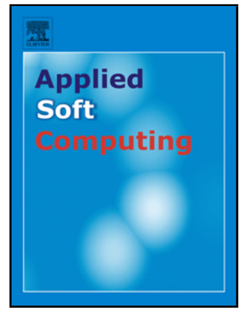

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Commentary on "Calculating fuzzy inverse matrix using fuzzy linear equation system"

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Abstract Basaran [Calculating fuzzy inverse matrix using fuzzy linear equation system, Applied Soft Computing, 12 (2012), 1810-1813] proposed a method for finding the inverse of a fuzzy matrix by assuming all the elements of the fuzzy inverse matrix as non-negative fuzzy numbers, while some of the elements of fuzzy matrix inverse may also be negative fuzzy numbers. Keeping the same in mind, Mosleh and Otadi [A discussion on Calculating fuzzy inverse matrix using fuzzy linear equation system", Applied Soft Computing, 28 (2015), 511-513] assumed $(i, j)^{th}$ element $\tilde{x}_{ij} = (x_{ij}, \alpha_{ij}, \beta_{ij})$ of the fuzzy inverse matrix as a non-negative fuzzy number if the value of x_{ij} obtained by Basaran's approach, is a non-negative real number and a negative fuzzy number if the value of x_{ij} is negative real number. In this paper, it is shown that the fuzzy multiplicative inverse of a fuzzy matrix, obtained by considering this assumption, is also not an exact fuzzy multiplicative inverse. Furthermore, the required modifications, in Mosleh and Otadi's approach, to obtain the exact multiplicative inverse of a fuzzy matrix are suggested.

1 Basaran's Approach

Basaran [1] proposed the following approach to find the multiplicative fuzzy inverse of a fuzzy matrix $\tilde{A} = [(a_{ij}, \gamma_{ij}, \delta_{ij})]_{n\times n}$.

Step 1: Let $\tilde{X} = [(x_{jk}, \alpha_{jk}, \beta_{jk})]_{n\times n}$ be the multiplicative fuzzy inverse matrix of fuzzy matrix $\tilde{A} = [(a_{ij}, \gamma_{ij}, \delta_{ij})]_{n\times n}$ and $\tilde{I}$ be the identity fuzzy matrix of order $n \times n$ having diagonal elements $(1, \alpha, \beta)$ and remaining elements $(0, \gamma, \delta)$. Then,

$$\tilde{A} \otimes \tilde{X} = \tilde{I} \qquad (P1)$$

which can be written as

$$\sum_{j=1}^{n} (a_{ij}, \gamma_{ij}, \delta_{ij}) \otimes (x_{jk}, \alpha_{jk}, \beta_{jk}) = \begin{cases} (1, \alpha, \beta), & i = k; \\ (0, \gamma, \delta), & i \neq k. \end{cases} \qquad (P2)$$

where $i, k = 1, 2, ..., n$

Step 2: Assuming $(a_{ij}, \gamma_{ij}, \delta_{ij}) \otimes (x_{jk}, \alpha_{jk}, \beta_{jk}) = (m_{ik}, \rho_{ik}, \phi_{ik})$, equations $(P2)$ can

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