

FUZZY ANALYTICAL HIERARCHY PROCESS WITH UNSYMMETRICAL TRIANGULAR FUZZY NUMBER FOR SUPPLIER SELECTION PROCESS



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Introduction



In the area of decision making, Analytical Hierarchy Process (AHP) is used for the decision making problem, where the problem can be structured hierarchically. AHP requires the decision maker (expert) to perform pairwise comparison. However, sometimes expert has difficulty to give clear judgment on the pairwise comparison. Therefore, in order to overcome this situation, AHP was extended to Fuzzy Analytical Hierarchy Process (FAHP) [1]. In FAHP the pairwise comparison is expressed as Triangular Fuzzy Number (TFN).

PROPOSED UNSYMMETRIC TRIANGULAR FUZZY NUMBER (UTFN) AND FAHP

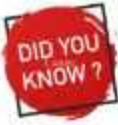
UTFN is used for representing judgment of preference. UTFN is defined by three values (l, m, u) where the value of (m - l) is not necessary the same as the value of (u - m) as TFN. The membership function of UTFN is similar with general triangular fuzzy number. In order to obtain these three values, expert is being asked the smallest possible, the most-likely, and the biggest possible judgment of preference

Triangular Fuzzy Number (TFN)



In TFN, comparison is expressed is represented by three values (l, m, u) [2, 3]. The TFN are usually selected from these values: (1, 1, 1), (1, 2, 3), (2, 3, 4), ..., (7, 8, 9), (9, 9, 9). In the perspective of the expert, l, m, and u are the lower, middle, and upper value of judgment, respectively

$$\mu_M(x) = \begin{cases} 0, & x \leq l \\ 1 - \frac{x-l}{m-l}, & l < x < m \\ 1, & x = m \\ 1 - \frac{x-m}{u-m}, & m < x < u \\ 0, & x \geq u \end{cases}$$



FACTS



Experts may use different value of TFN whenever they are questioned in detail about their smallest, most-likely, and biggest possible judgment, i.e. in the form of (1, 1, 2), (1/3, 2, 3).



Also, among all comparisons, expert confidants to give crisp judgment instead of fuzzy judgment for some comparisons. For example, the judgment is in the form of (3, 3, 3) or (7, 7, 7).

CONCLUSION



This paper proposed an unsymmetrical triangular fuzzy number which allow the experts give their own fuzzy number while doing pairwise comparison. Current existing FAHP methodology [4] is able to handle this unsymmetrical triangular fuzzy number

References

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