FUZZY LINEAR PROGRAMS WITH OCTAGONAL FUZZY NUMBERS

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Abstract. Zimmermann [9] developed the decision making concept in a fuzzy environment which was proposed and analysed by Bellman and Zadeh [3] in 1970. Its application in fuzzy linear programming was well handled by Tanaka et al. [7] and by Maleki et.al in [6] . Later several kinds of fuzzy linear programming problems have been dealt with and various methodologies have been adopted to solve such problems using trapezoidal fuzzy numbers for example as in [4, 8]. The concept of octagonal fuzzy numbers was introduced by the authors in an earlier paper [5]. In this paper the octagonal fuzzy numbers are used to solve fuzzy linear programming problems (FLP) involving simplex method. A method for solving FLP involving symmetric octagonal fuzzy numbers is developed and it may be noted that it is solved without converting to crisp linear programming problem. The process is illustrated with a numerical example involving a real life problem.

The distinguishing factor which is innovative in the present study is the use of a new arithmetic on symmetrical octagonal fuzzy numbers. On this class is introduced a binary operation of multiplication denoted by $*$ defined in Definition 1.2 that is more natural having the desired property $\widetilde{A} * \widetilde{B} \approx -(-\widetilde{A}) * \widetilde{B}$ and such a property is absent in the multiplication introduced by earlier authors in [4].

Keywords Fuzzy linear programming, symmetric octagonal fuzzy numbers, ranking.