

ABSTRACT**DECISION PROCEDURES BASED ON MODAL CONCEPT
AND ITS APPLICATION TO FUZZY MULTI-
OBJECTIVE LINEAR PROGRAMMING PROBLEM**

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The concepts of possibility distribution and measure have been introduced by L.A. Zadeh. The possibility distribution is regarded as a fuzzy restriction which acts as an elastic constraint on the values that may be assigned to a variable. The possibility measure of an event may be interpreted as the possibility degree of occurrence of the event under a possibility distribution. On the other hand, possibility, necessity, impossibility and contingency have been naturally extended to deal with fuzzy sets in the framework of Venn's diagram, using h-level sets by H. Prade. Zadeh's possibility theory is recovered in this approach. However, these modalities are considered as absolute indices. Namely, the fact that the possibility of an event is very large does not imply the reason that the possibility of opposite event is small. In this paper, the relative modalities are defined using Prade's modalities. The relative possibility is defined as the degree where the possibility of an event is larger than the possibility of opposite event. In the same way, the relative necessity, the relative impossibility and the relative contingency are defined. The relative necessity is not dual of the relative possibility but equal to the relative possibility. Therefore, the dual relative possibility is defined. And relations between the relative modalities and the absolute modalities are investigated. As one of the applications of these modalities, the decision procedures based on the modal concept are considered and divided into eight classes, so that fuzzy multi-objective linear programming problems are formulated using these procedures. These problems are reduced to nonlinear programs which are not necessarily convex programs. An approximating method of the global optimal solution using simplex method is proposed.