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A CLASS OF MULTI-OBJECTIVE INVENTORY MODEL WITH BIFUZZY COEFFICIENTS AND ITS APPLICATION

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Abstract. In this paper, we concentrate on discussing the inventory problem under bifuzzy environment and develop a class of multi-objective inventory model with bifuzzy coefficients. We give the bifuzzy transform operarion and prove the method of solving satisfied solution of multi-objective inventory model. These are applied to a practical inventory problem in which all inventory costs, purchasing and selling prices in the objectives and constraints are assumed to be bifuzzy in nature. The impreciseness in the above objectives and constraints are transformed into fuzzy variables which are similar trapezoidal fuzzy numbers. The exact parameters of fuzzy membership functions can be obtained through past observations. Then we compare the results with that from the fuzzy multi-objective model. The proposed model and algorithm, which will be of much use of the management, provide significant solutions to construct other inventory models with bifuzzy variables in real-life.

Keywords. bifuzzy, bifuzzy variable, bifuzzy multi-objective, inventory

1 Introduction

Fuzzy set theory has been well developed and applied in a wide variety of real problems since its introduction in 1965 by Zadeh [22]. The term fuzzy variable was first introduced by Kaufmann[1], then it appeared in Zadeh[18, 19] and Nahmias[26]. Possibility theory was proposed by Zadeh [19] and developed by many researchers such as Dubois and Prade[10, 9]. Some extensions of fuzzy set have been made in the literature. For example, Type 2 fuzzy set was introduced by Zadeh as a fuzzy set whose membership grades are also fuzzy sets[18]. The intuitionistic fuzzy set was proposed by Atanassov as a pair of membership functions whose sum takes values between 0 and 1[17]. Twofold fuzzy set was derived by Dubois and Prade from possibility and necessity measures as a pair of fuzzy sets: the set of objects which possibly satisfy a certain property, and the set of objects which necessarily satisfy the property[8]. Bifuzzy variable was initialized by Liu as a function from a possibility space to the set of fuzzy variables[4]. However, as far as we know, bifuzzy variables have been used in few inventory models.

Classical inventory models generally deal with a single-item. But in real world situation, a single-item inventory seldom occurs and multi-item