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AN INTERACTIVE FUZZY SATISFICING METHOD BASED ON SIMPLE RECOURSE MODEL FOR MULTIOBJECTIVE LINEAR PROGRAMMING PROBLEMS INVOLVING RANDOM VARIABLE COEFFICIENTS

Kosuke Kato and Masatoshi Sakawa

Graduate School of Engineering
Hiroshima University
Higashi-Hiroshima, 739-8527, Japan
{ kosuke-kato; sakawa }@hiroshima-u.ac.jp

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Abstract. *Two major approaches to deal with randomness or imprecision involved in mathematical programming problems have been developed. The one is called stochastic programming, and the other is called fuzzy programming. In this paper, we focus on multiobjective linear programming problems involving random variable coefficients in constraints. Using the concept of simple recourse, such multiobjective stochastic linear programming problems are transformed into deterministic ones. As a fusion of stochastic programming and fuzzy one, after introducing fuzzy goals to reflect the ambiguity of the decision maker's judgments for objective functions, we present an interactive fuzzy satisficing method to derive a satisficing solution for the decision maker by updating the reference membership levels. An illustrative numerical example is provided to demonstrate the usefulness of the proposed method.*

Keywords: Multiobjective linear programming, Stochastic programming, Interactive fuzzy satisficing method, Simple recourse model

1. **Introduction.** In constructing a mathematical model of decision making situations in the real world, we should use approaches to reflect the randomness or the imprecision involved in the situation since we cannot always know exact values of all parameters in the situation. Stochastic programming and fuzzy programming are two typical approaches for such decision making problems involving uncertainty.

Stochastic programming, as an optimization method based on the probability theory, has been developed in various ways [2, 29], e.g., two stage problem or recourse model [7, 27], chance constrained programming [4, 5, 11]. The development is now continued [8, 25, 26]. In particular, for multiobjective stochastic linear programming problems, Stancu-Minasian [22] considered the minimum risk approach, Teghem et al. [23] and Urli et al. [24] proposed interactive methods. Furthermore, efficient solution concepts for them and their relations have been discussed by Caballero et al. [3].

On the other hand, fuzzy mathematical programming representing the ambiguity in decision making situations by fuzzy concepts has attracted attention of many researchers [15, 17]. Fuzzy multiobjective linear programming, first proposed by Zimmermann [30], has been rapidly developed [13, 20, 21].

As a hybrid of the stochastic approach and the fuzzy one, Wang et al. [28] considered mathematical programming problems with fuzzy random variables and Liu et al. [12] researched on chance constrained programming involving fuzzy parameters and many researches about this issue have been reported [9, 14, 16]. In particular, for multiobjective stochastic linear programming problems, Hulsurkar et al. [10] discussed an approach