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GENERALIZED EXPECTED VALUE MODEL BASED ON COMPOUND QUANTIFICATION AND ITS APPLICATION IN TRANSPORTATION PROBLEMS

Fachao Li[1], Li Wang[1] and Yan Shi[2,*]

[1]School of Economy and Management
Hebei University of Science and Technology
No. 70, Yuhua East Road, Shijiazhuang 050018, P. R. China
lifachao@tsinghua.org.cn; wangli198601@yahoo.com.cn

[2]School of Industry Engineering
Tokai University
9-1-1, Toroku, Kumamoto 862-8652, Japan
*Corresponding author: yshi@ktmail.tokai-u.jp

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Abstract. *As a kind of particular programming, transportation problem draws much attention in many fields such as energy development, materials management, etc. In this paper, by analyzing the essence of stochastic programming and the deficiencies of existing methods, we propose a comparison method based on synthesizing effect for the standard to judge an objective value is good or not, and give the axiom system of stochastic synthesizing effect function, further, we introduce a quasi-linear pattern based on expectation and variance for the satisfaction of random constraints. Moreover, using synthesizing effect and quasi-linear pattern, we establish a stochastic programming pattern (generalized expected value model, and denoted by GEM for short) with good operability, and for the stochastic transportation problem, we also establish its corresponding generalized expected value model. Finally, we analyze the performance of GEM by combining with a transportation case under random environment. All these indicate that GEM includes the existing methods, and it can effectively solve the stochastic transportation problem under complex environment or with incomplete information, in addition, GEM can merge decision consciousness into solution through quantitative way.*

Keywords: Stochastic programming, Chance-constrained, Synthesizing effect, Generalized expected value model, Reliability coefficient, Transportation problem

1. **Introduction.** Transportation problem, a typical linear programming, plays a key role in logistics activity, so reasonable transporting process has practical significance to the overall planning and management of the whole logistic activities. There have been many perfect methods (such as the tabular method) for numerical transportation problems, however, there is no general solution to non-numerical transportation problems.

In actual, the transportation problem, with objective uncertainties (production, market, transportation conditions and so on) and subjective uncertainties (the judging of products, the evaluating of social benefits and so on), is a optimization problem of complex system. Therefore, with the difference of strategy of processing uncertain information, the delivery schemes usually have some differences, sometimes greater. At present, stochastic mathematics theory and fuzzy set theory can often be used as processing uncertain information. Stochastic methods are suitable for the uncertainty caused by inadequate objective conditions, and fuzzy methods are suitable for the uncertainty caused by the