

Multi-item economic production quantity model under single valued bipolar neutrosophic environment based on possibilistic theory

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Abstract. It is challenging for a decision-maker to decide a proper decision in severe situations of multi-aspirated real-life problems. So there is always an ambiguity in the mind of decision maker. Keeping such vagueness in mind, this paper aims to incorporate some situation parameters imprecise in nature. The imprecise parameters are taken in single-valued bipolar neutrosophic environments. Different arithmetic operations on the single-valued bipolar neutrosophic number using the (α, β) cut method are proposed in this paper. Using this we have calculated the possibility mean of single valued bipolar neutrosophic numbers. A multi-item economic production quantity model with one time only discount is considered here with some parameters in single valued bipolar neutrosophic number as a case study of our proposed work. A possibilistic mean de-fuzzification technique is used here using possibility measures. Finally, numerical illustration and sensitivity analysis is done for different variables to emphasize the excellence of our proposed work.

Keywords: Possibilistic mean, bipolar neutrosophic number, multi-item inventory model, one time only discount

1. Introduction

Possibility theory deals with characterization and analization of different types of uncertainties that occurs in different situations of a mathematical modelling problem. The concept of fuzzy set possibility theory was first made by L. Zadeh [2]. After that many researchers like Dubois and Prade [3], Yager [8] and Klir [7], cultivated the idea of possibility measures. The concept of possibility theory and its evolution from fuzzy set theory is being discussed throughout the years. Like probability mean, variance, standard deviations of a random variable in a crisp environment, Possi-

bility mean, variance, standard deviations are few common characteristics of possibility measures in fuzzy environment. The notation of upper and lower possibility mean was first mentioned by Carlsson and Fuller [4]. Fuller and Majlender [6] developed the concept of weighted possibility mean of interval valued fuzzy numbers. Most recently Garai et al. [5, 15] has developed the idea of possibility mean, variance, standard deviations, covariance of neutrosophic number and single valued bipolar neutrosophic number for multi-item inventory model and multi-attribute decision making for water resource management.

F. Smarandache [17] first coined the idea of neutrosophic set as a generalized form of fuzzy set theory and intuitionistic fuzzy set. After that single valued neutrosophic set and interval valued neutrosophic sets

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