

## EVALUATION OF SURVEY BY LINEAR ORDER AND SYMMETRIC FUZZY LINGUISTICS BASED ON THE CENTROID METHOD

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*ABSTRACT.* This paper employs fuzzy inference approach to overcome the difficulties in reflecting interviewee's incomplete and uncertain thought for survey. This proposed approach, different from conventional survey algorithms via questionnaire rating item by linguistic variables, possesses the vague nature, employs fuzzy sense of sampling to express the degree of interviewee's feelings based on his own concept, the result will be closer to interviewee's real thought. In addition, an example implementation establishes to illustrate the rate of aggregative investment benefit evaluation process under the fuzzy environment. The proposed fuzzy assessment method for sampling survey using linear order symmetrical linguistics is easily to assess the survey and evaluate the aggregated assessment.

**Keywords:** Evaluation of survey, Fuzzy linguistics

**1. Introduction.** Statistical analysis via survey is a powerful market research tool to understand the useful information for business strategy plan. Traditionally, we compute statistics with sample data by adopting questionnaires according to the thinking of binary logic. However, the answers of questionnaires may lead to an unreasonable bias since the human thinking is full with fuzzy and uncertain. There are two common methods existing, multiple-item and single-item choices, while using linguistic variable as rating item. We use mark or unmark to determine the choice for each item, i.e., the marked item is represented by 1, while the other unmark item is represented by 0. Generally speaking, the linguistic variable possesses the vague nature [1-3]. For example, most of the survey's items ask respondents to answer using 5-point response categories in terms of agreement, (e.g., strongly agree, agree, neither, disagree, strongly disagree), or frequency (e.g., always, most of the time, sometimes, rarely, never). These linguistic variables are fuzzy languages that can not be used to express the real situation by reliability of 0 or 1 to mark item. Therefore, in this paper, we apply a value  $m$  which belongs to the closed interval  $[0, 1]$  to represent the reliability or membership grade in the fuzzy sense of marking item.

Fuzzy sets theory was introduced by Zadeh [4] to deal with problem in which vagueness is present, linguistic value can be used for approximate reasoning within the framework of fuzzy set theory [5] to effectively handle the ambiguity involved in the data evaluation and the vague property of linguistic expression, and normal triangular fuzzy numbers are