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Consistency of hesitant fuzzy linguistic preference relations: An interval consistency index

Cong-Cong Li^{a,b}, Rosa M. Rodríguez^b, Francisco Herrera^{b,c}, Luis Martínez^d, Yucheng Dong^a

^a*Business School, Sichuan University, Chengdu, China*

^b*Department of Computer Science and Artificial Intelligence, University of Granada, Granada, Spain*

^c*Faculty of Computing and Information Technology, King Abdulaziz University, Jeddah, Saudi Arabia*

^d*Department of Computer Science, University of Jaén, Jaén, Spain*

Abstract

The study of hesitant consistency is very important in decision-making with hesitant fuzzy linguistic preference relations (HFLPRs), and generally the normalization method is used as a tool to measure the consistency degree of a HFLPR. In this paper we propose a new hesitant consistency measure, called interval consistency index, to estimate the consistency range of a HFLPR. The underlying idea of the interval consistency index consists of measuring the worst consistency index and the best consistency index of a HFLPR. Furthermore, by comparative study, a connection is shown between the interval consistency index and the normalization method, demonstrating that the normalization method should be considered as an approximate average consistency index of a HFLPR. *Keywords:* linguistic preference relation; hesitant fuzzy linguistic term sets; consistency measure; interval index; average index

1. Introduction

Solving a decision problem with linguistic information implies the need for computing with words (CW)[11, 23, 24, 35, 36, 37]. In particular, Herrera and Martínez [14] proposed the 2-tuple linguistic representation model, which has been successfully used in a wide range of applications (e.g., [20, 21, 29, 31]). In recent years, different models based on linguistic 2-tuples, such as the proportional 2-tuple linguistic representation model [32], the model based on the linguistic hierarchy [7, 12, 13] and the numerical scale model

Email addresses: congcongli@correo.ugr.es (Cong-Cong Li), rosam.rodriguez@decsai.ugr.es (Rosa M. Rodríguez), herrera@decsai.ugr.es (Francisco Herrera), martin@ujaen.es (Luis Martínez), ycdong@scu.edu.cn (Yucheng Dong)

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