

Comparing Grey PROMETHEE II and Grey TOPSIS: The Case Study is Management of Karun River in Ahvaz eara

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Abstract

MCDM is a complex decision-making tool and involved quantitative and qualitative criteria. In recent years, several methods have been proposed to aid Decision Support Systems for selecting the best compromise alternative especially in management problems. Two of the most efficient methods for this purpose are PROMETHEE II method and TOPSIS method that are used in this study and due to the uncertainties in the qualitative criteria, grey numbers are used. The management scenarios of Karun River are ranked and compared by these methods and the results were shown that these methods are similar in ranking approximately but different in steps of method and time spending.

Key word: Comparing, PROMETHEE II, Grey TOPSIS, Karun River

1. Introduction

MCDM (Multi Criteria Decision Making) methodology can handle various different and conflicting criteria for selecting best solution among decision alternatives [1]. No decision methodologies can be using to all decision problems, but proper methods can be design to a specific decision problem [2]. For management problems, between the numerous approaches, one of the most common is multi criteria decision making (MCDM). This method considered as a complex and dynamic process [3]. The main steps of multi criteria decision making are the following[4]: (a) Establishing system evaluation criteria; (b) Generating alternatives; (c) Evaluating alternatives in terms of criteria; (d) Applying a multi criteria analysis method; (e) Selecting best alternative; It is usually assumed that the criteria are independent in MCDM. A considerable number of decision models such as preference ranking organization method (PROMETHEE) have been developed based on the MCDM theory [5]. By Brans in 1982 the PROMETHEE developed and has attracted much attention from academics and specialists [6, 7]. PROMETHEE II is the modified version of PROMETHEE method and the study of Parreiras and Vasconcelos showed in general when nonconvex problems are considered the multiplicative PROMETHEE gets more attractive results than the original PROMETHEE II [8]. Another prevalent MCDM method used in this study is the TOPSIS method. TOPSIS (technique for order preference by similarity to an ideal solution) is based on “closeness to the ideal”, which originated in the compromise programming method [4]. Deng et al. (2000) presented a modified TOPSIS method [9]. TOPSIS method is proposed by Hwang and Yoon [10] is a well-known MCDM approach and it is based on the concept that the best solution