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Ching-Ter Chang

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Ching-Ter Chang

Department of Information Management, Chang Gung University, 259 Wen-Hwa 1st Road, Kwei-Shan Tao-Yuan, Taiwan. Email: chingter@mail.cgu.edu.tw

Department of Thoracic Medicine, Chang Gung Memorial Hospital at Linkou Taoyuan, Taiwan, R.O.C

Department of Industrial Engineering and Management, Ming Chi University of Technology, Taiwan, R.O.C

Abstract

This paper integrates fuzzy linearization strategy, goal programming, a membership function and conditional control mechanisms to produce a new method to deal with the binary behavior of multiple objective fractional programming problems and multiple objective fractional programming problems with a utility function. The major contributions of the proposed method are twofold. (1) The binary behavior of multiple objective fractional programming problems can be easily converted into a linearized program using the proposed fuzzy linearization strategy. The linearized program can easily be solved, using commercial linear programming packages, yielding an approximate global optimal solution, and (2) The utility function is also used to ensure that the qualification requirements for a multiple objective fractional programming problem are met, in contrast to most past mathematical approaches, which only use quantitative approaches to deal with such a problem. In addition, in order to demonstrate the usefulness of the proposed model, an illustrative example and a practical real case are provided. This discussion of the practical problem will help decision makers to realize the usefulness of a utility function and the binary behavior in multiple objective fractional programming problems.

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