ABSTRACT. In this paper a surrogate to traditional utility optimization is presented. This approach is based on multiple criteria decision making techniques through a theorem which connects utility function optimization with compromise programming. Apart from common assumptions in the literature the only specific assumption underlying the approach seems realistic, and is markedly related to traditional analysis.

Keywords: Utility theory, compromise programming.

1. INTRODUCTION

The basic traditional structure underlying any choice problem in economics can be summarized as follows:

\[
\begin{align*}
\text{Max } Z &= Z(x_1, x_2) \\
\text{subject to } T(x_1, x_2) &= k
\end{align*}
\]

where \((x_1, x_2)\) represents elections for the decision-maker (e.g. commodity-mix in a consumer’s choice problem, vector of outputs in a joint production problem, composition of a portfolio of securities, etc.); \(Z(x_1, x_2)\) is the utility function for the decision-maker, and \(T(x_1, x_2) = k\) the attainable or feasible set (budgetary boundary in consumer theory, transformation curve in joint production problems, efficient frontier in portfolio analysis, etc.).

The essence of microeconomic analysis lies within structure (1). Thus, economic rationality is usually defined in terms of maximizing a consistent and transitive function such as \(Z(x_1, x_2)\) subject to the satisfaction of the feasible set. This approach has long been used because of its elegance, although its empirical worth is doubtful for a practical reason. Implementation of traditional analysis requires one to obtain a reliable mathematical representation of \(Z(x_1, x_2)\) which demands very precise information which is not available in many
scenarios. In other words, $Z(x_1, x_2)$ is often unknown. For example, an economist can rarely deal with a consumer's empirically elicited utility function, and still less with an empirical social utility function.

Moreover, it might be useful to remember that the logical soundness of the utility function has been severely criticized in several decision contexts. Some of the assumptions necessary to the acceptance of the existence of a utility function (comparability, reflexivity, transitivity, and continuity of preferences) seem questionable; e.g. the continuity of preferences in many decision making problems within the field of natural resources planning. However, this controversial topic will not be considered in the present paper. We do not seek to modify the core of the traditional paradigm since it is commonly accepted in the literature and has proved its explanatory power for the economist's intellectual necessities. On the contrary, we are looking for a bridge between utility functions and operational research, improving the potentiality of the traditional paradigm in economic applications.

This paper presents an effective surrogate for (1) aimed at avoiding the above informative difficulty. The proposed approach is derived from a multiple criteria decision making method (MCDM) known as compromise programming (CP) developed by Yu (1973) and Zeleny (1973, 1974). Although CP has been widely applied in many Management Science/Operational Research problems, it is still relatively unknown in economics.

2. THE CP CHOICE

The primary idea in CP is the identification of an infeasible ideal solution as a basket in which each attribute under consideration achieves its optimum value. The ideal basket or ideal point is just a referential utopian target. For instance, consider a country which can produce both aircraft (good 1) and cars (good 2); by allocating all its resources to aircraft it can attain $x_1^*$ units, whereas by allocating them to cars it can attain $x_2^*$ units. Hence, the obviously unattainable utopian basket $(x_1^*, x_2^*)$ would be its ideal point. The country's golden dream consists of simultaneously producing $x_1^*$ aircraft and $x_2^*$ cars; however, this dream is impossible. The country can either produce $x_1^*$