

INTERACTION OF CRITERIA IN GRADING PROCESS

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ABSTRACT

The main step in multicriteria decision making, including the classical multiattribute utility (MAUT) model is aggregation. In MAUT, we aggregate uni-dimensional utility functions U_i into a single global utility function combining all the criteria. One of the simplest process of aggregation is weighted arithmetic sum

$$U(x_1, \dots, x_n) = \sum_{i=1}^n w_i U_i(x_i),$$

called additive utility. In grading process this is the most frequently used procedure. In this paper we are discussing a problem where additive utility is not suitable to express decision maker's preferences.

We are introducing a new method, **Potential method (PM)**, where the main object is **preference graph** and aggregation procedure is done on the set of preference graphs for each criteria. At this stage, ELECTRE method and PM have some common points, although PM seems to be more sophisticated. Potential method treats missing data decision problem as well, and this feature of PM is crucial in solving grading problem with interaction of criteria.

First, we state the problem in the form of example following by a short description of PM. After that we explain two possibilities how PM can be applied to solve the problem. The first one is subjective, and another one takes into account the full criteria profile of the students under consideration. The second approach introduces the new criteria called **coalitions** and only those coalitions are considered that have **strength** over the certain threshold. This leads to a missing data problem with exact values which is solved using PM. Finally, we are discussing one idea, often used in grading process, of adding a new criteria that takes into account oscillation of the the individual grades.

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