

NONLINEAR EXPERT PREFERENCE FUNCTION CONCORDANCE IDENTIFICATION FOR MULTIPLE CRITERIA DECISION MAKING

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One of the most important problems of decision making theory is multiple criteria comparative assessments and ordering of objects or alternative decisions based on expert judgments [1]. The well-known and widely practiced approach to such a problem is the reduction of a set of partial performance criteria to the generalized one, known as an integral indicator, which may be considered as an aggregate performance index of objects (alternatives) over for all criteria and should be constructed on the basis of expert preferences.

The problem of expert nonlinear preference function reconstruction is considered using measured performance indexes (“object – feature” data) as well as expert estimations of both feature weights and partial object’s integral indicators. Therefore the preference function reconstruction may be considered as specific identification problem, which is solved by means of machine learning approach. The usage of support vector machine approach combined with kernel-based method provides a significant reduction in the number of estimated parameters of integral indicator model and allows possibility of nonlinear preference function reconstruction [2].

The proposed generalization of expert estimates concordance idea [3] for the case of nonlinear preference function guaranties on optimal concordance of measurement and expert data, whereas machine learning approach ensure the possibility of more accurate approximation of expert preference function with complex structure.

References

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