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AUTOMATIC DEFINITION OF OPTIMAL DEFAULT PARAMETERS OF ALGORITHMS

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Abstract. As a rule, when a user applies some algorithm, she/he submits to it an input as well as provides values for its parameters. Any particular choice of the parameters affects the received final results and may vary significantly for different kinds of inputs. On the other hand, an inexperienced user may hardly figure out what we are talking about. That is why, the default values of the parameters should be provided.

For such situations, we propose a general multi-criteria approach. In each particular application, we define the "best" combination of parameters. The set of parameters will be used as defaults for each algorithm. The approach is very general and may be applied to the definition of any set of default parameters of a wide repertoire of algorithms in many industrial, technical and scientific applications.

Keywords. Multi-criteria optimization and identification, default parameters, clustering, decision making

1 Introduction

Typically, when a user applies some algorithm of data proceeding, she/he submits to it an input as well as provides values for its parameters. The parameters affect the received result and may vary for different kinds of inputs. On the other hand, an inexperienced user may hardly figure out what are we talk about. That is why, the default values of the parameters should be provided.

The classical and yet actual inverse problems, as described in particular in [19, 3], deal with the tuning of model's and algorithm's parameters. The tuning is as good as the data, measured in the reality and predicted/detected by the algorithm are close. As a rule, the algorithm is applied to clusters of objects. Moreover, there are dozens of tunable parameters, which may vary significantly depending on the particular cluster. This means that different clusters under consideration may dictate different values of the (default) parameters of the algorithm.

In this contribution, we propose a multi-criteria approach to identification of defaults values of algorithms. We assume that the original data are naturally divided into clusters, such that each cluster corresponds to a particular kind of regularity. We use the clusters in order to define the "best" default parameters of a data proceeding algorithm. We demonstrate our approach using two examples. The first one is *Linear Prediction Coding* (LPC) for impulse noise detection in sound proceeding. The second one is a definition of