

12. *Multidimensional Quantification. I*

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This is a continued report from the papers 1) and 2) (see references) previously published, in which are treated some methods of quantification of qualitative data in multidimensional analysis and especially how to quantify qualitative patterns to secure the maximum success rate of prediction of phenomena from the statistical point of view. The important problem in multidimensional analysis is to devise the methods of the quantification of complex phenomena (intercorrelated behaviour patterns of units in dynamic environments) and then the methods of classification. Quantification means that the patterns are categorized and given numerical values in order that the patterns may be able to be treated as several indices, and classification means prediction of phenomena. The aim of multidimensional quantification is to make numerical representation of intercorrelated patterns synthetically to maximize the efficiency of classification, i. e. the success rate of prediction. Quantification does not mean finding numerical values but giving them patterns on the operational point of view in a proper sense. In this sense, quantification has not absolute meaning but relative meaning to our purpose. To achieve this purpose, we should always be aware of rational behaviour that is to pursue the so-called "optimum".

Thus we can give numerical values (weights) and distances to qualitative patterns (data) by analysing complex phenomena, quantifying and synthesizing. For example, "Kan" (efficient subjective judgement of experts) will be able to be analyzed and treated quantitatively and so to become a common property to us. In the present paper, the methods of quantification of qualitative patterns are considered in the case where an outside variable (realized by the outside criterion) is given in the form of qualitative classification. In this case it is most important that we must devise the methods to fulfil the property of validity. Let us take a universe of n elements, each of which has, as a label, behaviour patterns categorized by a survey method and is classified into only one class by the definite outside criterion (this is an outside variable). Here the outside criterion must be on an absolute scale and not change relatively to what elements of universe are classified (judged). That