

A New Approach to Comparison and Sorting of Grey Numbers*

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Abstract

The comparison and sorting of grey numbers is an important issue in the grey systems theory, as it allows us to attain two types of objectives. First of them is to define the minimum and maximum values in a given set of grey numbers. Another one is to determine whether the set of grey numbers shows an ascending or descending sequence. The purpose of this article is to present a new approach to the comparison and sorting of grey numbers. We have suggested a distinction between two categories of grey numbers: abstractive grey numbers, which do not refer to any object existing in real world and are only of a conceptual nature, and concrete grey numbers, which refer to an object existing in real world and are of an empirical nature. We have proposed two methods of comparing and sorting grey numbers. The first of them enables us to compare and sort abstractive grey numbers (based on the probability theory), and the other one – to compare and sort concrete grey numbers (based on the modified expected value theory). In section (2), we present the most important characteristics of grey numbers and propose a classification into abstractive and concrete grey numbers. Section (3) includes the approaches to comparing and sorting abstractive and concrete grey numbers. Section (4) contains empirical examples of comparing and sorting grey numbers. In section (5), we present the most important conclusions.

Keywords: grey numbers, grey numbers comparison, grey numbers sorting, abstractive grey numbers, concrete grey numbers