ON THE FUZZY SET OPTIMIZATION OF COMPLEX SYSTEMS

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A preliminary notion of a complex system is regarded as a collection consisting of more elementary components such that they constitute a unified species with an increased complexity [1]. This concept comes from the contraposition of the whole and its elements. Constituting the whole members of a complex collection can be less or more diversified. In general case, this diversification has quantitatively been characterized by heterogeneity and homogeneity and their particular cases called splitting and overlapping. Extremely, overlapping (*o*) equals 0, when all members of the system are disjoint, and simultaneously it is accompanied by value 1 of splitting (*s*). This is a consequence of fuzzy set pseudo-metric evaluations of internal relationships in the system [2,3]. Overlapping and splitting are not equivalent, mutually complementing each other characteristics. A series of theorems has been framed to distinguish the core, support and non-belongingness classes. Certain elementary functions *f(o,s)* turned out to optimize systems in the minima of these functions. The examples are provided of theoretical chemistry, system analyses with the golden section involved, group theory, convergence concepts, etc. By this inspiration, using non-discrete measures on Boolean rings a general theorem has been proved on optimization of complex systems.

References:

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