A Possibilistic Prediction Problem for Weakly Structured Processes

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This work deals with the prediction problems of incomplete, imprecise, anomalous and extremal processes in nature and society, where connections between the system's objects are weakly structured, which is caused by lack of complete objective information about the evolution of studied processes. The new approach may successfully apply, For example, in 1) complex engineering processes; 2) decision making problems in economics and business for extreme environment; 3) emergency management problems in after disaster region (evacuation processes, transportation of humanitarian aid goods, facility location in catastrophe areas, estimation of disease spreading in epidemical regions); 4) research of complex systems of applied physics; 5) conflictology, sociology, medical diagnosis; 6) big data analytics, where big time series are transformed in EFDS; etc.

Dual (extreme) approach to the research in weakly structured dynamic systems with respect to fuzzy-time is a novelty and does not have analogues today. The extremity of fuzzy processes allows fuzzy-dynamic systems and their prediction to be described by the "extended current and compressed future fuzzy time intervals" in phase-time intervals and thus obtain more reliable information on the expert, his knowledge, the study of EFDS, etc. We thus provide new types of structures for expert knowledge streams in synthesis and analysis problems. Taking into account the control element, for EFDS we construct new fuzzy-integral models. Reliable fuzzy-scenarios are also built for future time-intervals, and these scenarios provide new possibilities for challenging dynamic systems research. The software library representing a new instrument for projecting decision making intellectual systems and expert systems is constructed.