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AGRICULTURAL ECONOMICS
Zemědělská ekonomika

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Combining the crisp outputs of multiple fuzzy expert systems using the MPDI along with the AHP

Business, economic, and agricultural YES-or-NO decision making problems often require multiple, different and specific expertises. This is due to the nature of such problems in which decisions may be influenced by multiple

different, relevant aspects, and accordingly multiple corresponding expertises are required. Fuzzy expert systems (FESs) are widely used to model expertises due to their capability to model the real world values, which are not always exact, but frequently vague, or uncertain. In this paper, different expertises relevant to the decision solution are modelled using several corresponding FESs. These systems are then integrated to comprehensibly judge the YES-or-NO binary decision making problem, which requires all such expertises. This integration involves several independent and autonomous FESs arranged synergistically to suit a varying problem context. Then, the main focus of this paper is to realize such integration through combining the crisp numerical outputs produced by multiple FESs. The newly developed methods MPDI and WMPDI are utilized to combine the crisp outputs of multiple parallel FESs, whilst weights are determined through the analytical hierarchy process (AHP). The presented approach of utilizing the proved efficient MPDI combining criteria along with AHP will

encourage practitioners to take advantage of integration and cooperation among multiple numerically outputting knowledge sources in general.

Keywords:

fuzzy expert system (FES), combining criteria, group decision making (GDM), binary decision making, output combination/aggregation, AHP, knowledge integration

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