

Smart Diagnosis the Structural Damages Of Buildings: Fuzzy-genetic Approach

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We have proposed a hybrid fuzzy-genetic approach for smart diagnosis (determination of cause) the structural damages of buildings. The approach consists of the following procedure: (1) description of the diagnostic model structure by hierarchical tree of fuzzy logical inference; (2) presentation of state parameters in linguistic variable form; (3) formalisation of linguistic terms by fuzzy sets; (4) formalisation of expert judgements about relationship state parameters – diagnosis by fuzzy knowledge bases; (5) tuning the fuzzy knowledge bases by genetic algorithms. An application of the approach is illustrated the fuzzy expert system, finding the cause of stone construction crack of buildings. An usage of hierarchically connected fuzzy rule bases provides the transparent and compact diagnostic model. Tuning the fuzzy model by a genetic algorithm provides low misclassification level. The proposed fuzzy-genetic approach seems to be feasible to creation decision making support systems for damage detecting and diagnosis for various mechanical constructions.

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