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AN ENSEMBLE DETERMINISTIC MODEL BASED ON ROUGH SET AND FUZZY SET AND BAYESIAN OPTIMAL CLASSIFIER

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Abstract. *Based on rough set and fuzzy set and Bayesian optimal classifier, an ensemble transformer fault diagnosis and maintenance model is proposed in this paper. The model firstly applies fuzzy subjection degree functions of the observed information to establish the posterior probabilities of the prior assumptions in Bayesian optimal classifier, the classified results based on each fault information are then worked out, the best diagnostic result is acquired after all these results are weighted average. At the same time, according to probabilistic rough model of Bayesian risk decision, the diagnostic results are identified to constitute possible maintenance strategies. In the end, a practical application in transformer insulation faults diagnosis shows that the proposed model can tackle the "bottle neck" of fuzzy information acquisition in Bayesian optimal classifier and possesses stronger self-learning abilities, and is an ideal deterministic model.*
Keywords: Rough set, Fuzzy set, Bayesian optimal classifier, Deterministic model

1. **Introduction.** Transformers are one of the most key facilities in electrical power supply and distribution systems. To maintain normal operation of the facilities has long been considered as a basic guarantee for power supply reliability. To ensure a safe sound level of power supply, various possible faults and symptoms often need to be correctly forecast in advance. However, due to the complexities of transformer faults diagnosis, all sorts of couples of fault-masses and symptom-masses simultaneously exist, this makes the transformer faults diagnosis more difficult. The procedure to seek these couples of fault-masses and symptom-masses and to interpret them soundly is defined as fault diagnosis. In addition, as the transformer fault symptoms information is often fuzzy and indeterminate, the complexities of the transformer fault diagnosis are increased further. For these complicated and fuzzy indeterminate faults information, the conventional fault diagnosis methods are difficult to adapt. In recent years, people began to apply artificial neural networks (ANN) to perform the faults diagnosis in [1,2], it effectively tackled the "bottleneck" difficulties in the self-learning and knowledge acquisition. However, when