

博士论坛

动态模糊聚类及其在变压器故障诊断中的应用

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摘要 理论分析和实践表明, 电力变压器绝缘故障与油中特征气体组分含量及特征气体组分比值密切相关。提出一种基于遗传算法的动态模糊聚类算法, 有效融合特征气体组分含量及组分比值两类故障信息, 完成对变压器故障的动态聚类分析。该算法采用实数编码方案, 染色体长度可变, 不同的长度对应于不同的故障类别数; 并采用一种新的适合于变长染色体的交叉和变异算子。与特征气体法、三比值法进行对比实验, 表明该算法具有较高的判定正确率。

关键词 [溶解气体分析](#) [聚类分析](#) [故障诊断](#) [变长度遗传算法](#)

分类号

Dynamic fuzzy clustering algorithm and its application to fault diagnosis of power transformer

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Abstract

Theoretical analysis and practice indicate that the insulative faults of power transformers are closely related with both the components and the component ratios of various dissolved gas-in-oil. In this paper, a variable length coding genetic fuzzy cluster algorithm is designed to effectively fuse the above two kinds of information and accomplish the dynamic cluster analysis on the faults of power transformer. We adopt a cluster prototype-based dynamic real-coding scheme, in which the variable length chromosomes express cluster prototypes and different length of chromosomes corresponding to different numbers of cluster prototypes. Also, a kind of novel crossover operator and mutation operator are designed to adapt the variable length chromosomes. Theoretical analysis and experimental results indicate that the proposed method is valid.

Key words [dissolved gas analysis](#) [clustering analysis](#) [fault diagnosis](#) [variable-length coding genetic algorithm](#)

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