

高电压技术

利用改进遗传算法与LS-SVM进行变压器故障诊断

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摘要:

最小二乘支持向量机(least square support vector machines, LS-SVM)能较好地解决小样本、非线性数据特征的多分类问题, 适用于电力变压器油色谱故障诊断, 但参数 c 与 s^2 的选取对诊断结果影响较大, 因此有必要对其进行优化选择。文中利用改进遗传算法(improved genetic algorithm, IGA)对 c 与 s^2 参数进行寻优。IGA采用了编码机制随机产生初始种群, 这样可快速扩大搜索空间, 稳定群体中个体多样性, 有效提高全局搜索能力和收敛速度。文中采用IGA优化后的LS-SVM对多组变压器油色谱数据进行故障诊断分析。结果表明, IGA可以有效实现对LS-SVM算法中 c 与 s^2 的优化选取, 提高变压器故障诊断的准确率。

关键词:

A Transformer Fault Diagnosis Method Integrating Improved Genetic Algorithm With Least Square Support Vector Machine

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Abstract:

Least square support vector machines (LS-SVM) can solve small sample nonlinear multi-classification problem well, so it is applicable to the power transformer fault diagnosis by dissolved gas analysis (DGA), however the selection of parameters c and s^2 greatly impacts the diagnosis result, thus the optimized selection of these parameters is necessary. In this paper, the improved genetic algorithm (IGA) is applied to the optimized selection of c and s^2 . The initial population of IGA is randomly generated by coding mechanism, in this way, the search space can be quickly expanded and the diversity of individuals in the populations can be stabilized, thus both global search ability and convergence speed can be effectively improved. The LS-SVM optimized by IGA is applied to fault diagnosis by multi-sets of chromatographic data of transformer oil and the result shows that optimizing LS-SVM by IGA, the optimized selection of c and s^2 can be implemented effectively and the accuracy of power transformer fault diagnosis can be improved.

Keywords:

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