

ELVQ算法实现宽参数偏移的多故障电路诊断

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Multi-fault Diagnosis for Wide-deviation Analog Circuits Based on ELVQ Algorithm

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摘要

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摘要 该文提出了一种强化自适应策略的学习矢量量化(Enhanced Learning Vector Quantization, ELVQ)算法,并设计了基于SOM(Self-Organizing Map)-LVQ模型的故障分类方法,用于实现宽参数偏移的模拟电路多故障诊断。该文算法具有两方面的优势:一方面利用获胜神经元数目的自适应,均衡了神经元的获胜概率;另一方面根据样本分类结果计算作用因子修正神经元的权值,增强了类别边界决策性能。仿真结果表明,所提出的算法具有收敛速度快,分类误差小等特点。

关键词: 模拟电路 多故障诊断 学习矢量量化 宽参数偏移 ELVQ算法

Abstract: In order to realize the multi-fault diagnosis for wide-deviation analog circuits, this paper designs a classification model based on Self-Organizing Map-Learning Vector Quantization(SOM-LVQ) network, and also presents an Enhanced LVQ (ELVQ) algorithm, in which the win-probability of neural can be balanced and the point density of the neural around the Bayesian decision surfaces can be reduced. The results of simulation indicate that the proposed algorithm has advantages of rapid convergence and low classification error.

Keywords: Analog circuits Multi-fault diagnosis Learning Vector Quantization (LVQ) Wide-deviation Enhanced LVQ (ELVQ) algorithm

Received 2011-01-06;

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引用本文:

徐崇斌, 赵志文, 郑慧芳. ELVQ算法实现宽参数偏移的多故障电路诊断[J] 电子与信息学报, 2011, V33(6): 1520-1524

Xu Chong-Bin, Zhao Zhi-Wen, Zheng Hui-Fang. Multi-fault Diagnosis for Wide-deviation Analog Circuits Based on ELVQ Algorithm[J], 2011, V33(6): 1520-1524

链接本文:

http://jeit.ie.ac.cn/CN/10.3724/SP.J.1146.2011.00011 或 http://jeit.ie.ac.cn/CN/Y2011/V33/I6/1520

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