

## A technique to aggregate classes of analog fault diagnostic data based on association rule mining

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### Abstract

© 2018 IEEE. Analog circuits are widely used in different fields such as medicine, military, aviation and are critical for the development of reliable electronic systems. Testing and diagnosis are important tasks which detect and localize defects in the circuit under test as well as improve quality of the final product. Output responses of fault-free and faulty behavior of analog circuit can be represented by infinite set of values due to tolerances of internal components. The data mining methods may improve quality of fault diagnosis in the case of big data processing. The technique of aggregation the classes of fault diagnostic responses, based on association rule mining, is proposed. The technique corresponds to the simulation before test concept: a fault dictionary is generated by collecting the coefficients of wavelet transformation for fault-free and faulty conditions as the preprocessing of output signals. Classifier is based on k-nearest neighbors method (k-NN) and association rule mining algorithm. The fault diagnostic technique was trained and tested using data obtained after simulation of fault-free and faulty behavior of the analog filter. In result the accuracy in classifying faulty conditions and fault coverage have consisted of more than 99,09% and more than 99,08% correspondingly. The proposed technique is completely automated and can be extended.

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