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SBT Approach towards Analog Electronic Circuit Fault Diagnosis

An approach for the fault diagnosis of single and multiple faults in linear analog electronic circuits is proposed in this paper. The simulation-before-test (SBT) diagnosis approach proposed in this write up basically consists of obtaining the frequency response of fault free/faulty circuit. The peak frequency and the peak amplitude from the error response are observed and processed suitably to extract distinct signatures for faulty and nonfaulty conditions under maximum tolerance conditions for other network components. The artificial neural network classifiers are then used for the classification of fault. Networks of reasonable dimensions are shown to be capable of robust diagnosis of analog circuits including effects due to tolerances. This is a unique contribution of this paper. Fault computation time is drastically reduced from the traditional analysis techniques. This results in a direct dollar savings at test time. A comparison of the proposed work with the previous works which also employ preprocessing techniques, reveals that our algorithm performs significantly better in fault diagnosis of analog circuits due to our proposed preprocessing techniques.

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