Rajesh A. Patil, Fault diagnosis in analog circuits, M. Tech. Thesis, Department of Electrical Engineering, Indian Institute of Technology Bombay, 2000.

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*Abstract* - Fault diagnosis of analog networks has become an increasing active research area recently. Analog fault diagnosis is the problem of detecting the faulty analog networks and locating the faulty elements or parameters in those faulty networks. Different approaches of fault location such as parameter identification, fault verification and fault dictionary are discussed and illustrated with an example. A procedure for generating fault dictionary in frequency domain is described. A symbolic approach for fault diagnosis and a systematic approach to maximize the fault location capability are proposed. In this approach, the circuit is simulated at a number of different fault possibilities and the results are stored in dictionary. The faulty circuit measurements are then correlated with simulated results in the dictionary and the faulty components are identified. This approach only requires one analysis for circuit topology to generate the network transfer function and a parameter substitution to obtain the frequency response of the circuit. An efficient program is written in C langauge to deal with the frequency responses and to automatically generate the fault dictionary. The difference between the measurement data and the frequency responses from the fault dictionary is evaluated to determine the diagnosis result. The theoretical basis of the procedure is also discussed. An example is worked out in detail to demonstrate the feasibility of the proposed approach.