Abstract

During the development process of safety-critical systems, the analysis of the designed product is an important step to ensure that the product is operating properly indeed. One such method is called worst-case circuit analysis, which is used to investigate the effects of component parameter tolerances and environmental conditions on the behaviour of the circuit.

In my paper, I briefly describe the worst-case analysis process and suggest ways to improve the efficiency of each part.

I propose introducing mathematical computational models instead of the simulation models used in simulator programs to make the analysis process more efficient. To this end, system equations are automatically generated from circuit diagrams and can be solved analytically using MATLAB.

The results obtained are used with different extreme value-finding algorithms to perform worst-case tests according to the requirements. I implement the measurement procedures in a universal test environment, keeping a close link to the requirements.

During the development of the applied procedures, I strive to produce modular software components that can be used to solve particular tasks with few modifications.

The functioning of the implemented framework and the correctness and effectiveness of my solution are supported by measurements and illustrated with examples.