Evaluation of the transient analysis method ability for detecting deviation faults in space environments

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Resumen

In this work, we evaluate the ability of the transient response analysis method (TRAM), a low cost off-line test strategy proposed for filters to detect deviations in circuit specifications beyond established limits. For this assessment, we adopt as case study a benchmark second-order filter and formulate a deviation-fault model that take into consideration the physics of the degradation in space environments. Particularly, we consider the so-called displacement damage produced by the impact of high-energy particles which leads to progressive deviations in the value of integrated diffused resistors. These deviations may cause the performance degradation of the entire application. In order to improve and maximize the fault coverage, several transient response parameters are taken into account. The simulation results show that TRAM reaches excellent fault coverage, suggesting that its use in space applications is encouraging.

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