

A Soft Error Rates (SER) Evaluation Method of Combinational Logic Circuit Based on Linear Energy Transfers

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Abstract : Communication stability is the primary concern of communication satellites. Communication satellites are easily affected by particle radiation to generate single event effects (SEE), which leads to soft errors (SE) of the combinational logic circuit. The existing research on soft error rates (SER) of the combined logic circuit is mostly based on the assumption that the logic gates being bombarded have the same pulse width. However, in the actual radiation environment, the pulse widths of the logic gates being bombarded are different due to different linear energy transfers (LET). In order to improve the accuracy of SER evaluation model, this paper proposes a soft error rate evaluation method based on LET. In this paper, the authors analyze the influence of LET on the pulse width of combinational logic and establish the pulse width model based on the LET. Based on this model, the error rate of test circuit ISCAS'85 is calculated. The effectiveness of the model is proved by comparing it with previous experiments.

Keywords : communication satellite, pulse width, soft error rates, LET

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