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Reliability Considerations at Nanometer Scale

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Abstract
This paper analyses some aspects concerning the reliability at nanometer scale. Although higher reliability is expected from submicron and nanotechnology so far only a few attempts have been made to apply reliability theory to submicron and nanodevices. The way to reliable nanotechnology is to identify relevant physical failure mechanisms and corresponding failure rates, determine reliability indices, and investigate reliability models down to nanoscale including quantum processes. Perhaps the most significant problem concerns the sensitivity of future IC generations face to various noise sources, and in particularly face to energetic particles. This paper analyses some of the above problems. At the same time, we propose the implementation of a new soft error detecting technique based on time redundancy.

Keywords: Reliability, Fault tolerance, Redundancy, Submicron and nanodevices, Soft-error.

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