Abstracts

Minimization of Delay and Crosstalk in High-Speed VLSI Interconnects

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This paper presents design optimization of time responses of high-speed VLSI interconnects modeled by distributed coupled transmission line networks. The problem of simultaneous minimization of crosstalk, delay and reflection is formulated into minimax optimization design variables include physical/geometrical parameters of the interconnects and parameters in terminating/matching networks. A recently published simulation and sensitivity analysis technique for multiconductor transmission lines is expanded to directly address the VLSI interconnect environment the new approach permits efficient physical/geometrical oriented interconnect design using exact gradient based minimiax optimization. Examples of interconnect optimization demonstrate significant reductions of crosstalk, delay, distortion and reflection at all vital connection ports. The technique developed is an important step towards optimal design of circuit interconnects for high-speed digital computers and communication systems.

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