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Time-Domain Analysis of Pulse Parameters Effects on Crosstalk in High-Speed Circuits

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Abstract : Crosstalk among interconnects and printed-circuit board (PCB) traces is a major limiting factor of signal quality in high-speed digital and communication equipments especially when fast data buses are involved. Such a bus is considered as a planar multiconductor transmission line. This paper will demonstrate how the finite difference time domain (FDTD) method provides an exact solution of the transmission-line equations to analyze the near end and the far end crosstalk. In addition, this study makes it possible to analyze the rise time effect on the near and far end voltages of the victim conductor. The paper also discusses a statistical analysis, based upon a set of several simulations. Such analysis leads to a better understanding of the phenomenon and yields useful information.

Keywords : multiconductor transmission line, crosstalk, finite difference time domain (FDTD), printed-circuit board (PCB), rise time, statistical analysis
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