Abstracts

The Implementation of Time-Domain Diakoptics in the FDTD Method

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The time-domain Diakoptics is implemented in the finite-difference time-domain (FDTD) method with two types of connecting interfaces: i) directional interface (TLM-type), and ii) total-field interface (FDTD-type). The FDTD-type interface provides a more efficient way to realize time-domain Diakoptics than TLM, especially for device optimization problems. To emulate the TLM-type interface in FDTD, two novel algorithms are developed in this paper. One is to implement an ultra-wideband absorbing boundary on the excitation plane during excitation. The other is to separate directional waves without the knowledge of incident waves. For a large circuit with cascaded modules, sequential and parallel algorithms are provided to connect them. With these connecting algorithms, time-domain Diakoptics is one candidate method to realize modular and parallel computation in FDTD simulations. The validity of these algorithms is confirmed by comparison with simulated results from Microwave SPICE.

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