Abstracts

Spatially Looped Algorithms for Time-Domain Analysis of Periodic Structures

M. Celuch-Marcysiak and W.K. Gwarek. "Spatially Looped Algorithms for Time-Domain Analysis of Periodic Structures." 1995 Transactions on Microwave Theory and Techniques 43.4 (Apr. 1995, Part I [T-MTT]): 860-865.

A class of spatially looped time-domain algorithms is developed. These algorithms prove to be effective tools for the analysis of microwave periodic structures. They use the FDTD or TLM simulation of only one spatial period, with a new type of boundary condition modeling its behavior in the entire structure. Applications to a sinusoidally corrugated slow wave structure and to a four-wall corrugated waveguide are presented. The paper includes a tutorial part, discussing the physical nature of solutions produced by the spatially looped algorithms. This explains the meaning of complex notation in the time domain, and the possibility of reducing the calculations of uniform and periodic guiding structures to real numbers.

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