Abstracts

A Fourth-Order in Space and Second-Order in Time TLM Model

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In this paper a new TLM model is presented for solving two-dimensional electromagnetic field problems. The new model possesses the same dispersion relation as a fourth-order in space and second-order in time central-finite-difference algorithm. The stability criterion of the TLM model (given in terms of permissible values for the admittance of the permittivity stub) is provided. Investigation of the propagation characteristics indicates the benefits of fourth-order spatial discretization, especially for modelling dielectric media. The improved dispersive properties of the fourth-order models make them attractive candidates for the analysis of electrically large (and inhomogeneous) problems. The scattering and transfer events for the new model are presented as well as results from numerical experiments. The improved computational efficiency of the new fourth-order accurate model in terms of both memory storage and computation time (as compared to the original second-order TLM algorithm) is demonstrated.

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