Abstracts

Efficient FDTD modeling of irises/slots in microwave structures

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A new methodology is proposed for the computationally efficient, numerically stable, and accurate FDTD simulation of microwave structures with electrically thin irises and slots. The proposed method is based on the hybridization of Yee's standard FDTD scheme with Pade approximations of the electromagnetic properties of the irises/slots. Using rigorous modal expansions for the description of the fields in the waveguide sections formed by the irises/slots, highly accurate rational function approximations of their transmission and reflection properties are obtained. These transfer functions are then incorporated directly in the FDTD algorithm through their corresponding z-transform expressions. Results from the analysis of typical building blocks in combline filters and multiplexes for the satellite and wireless communications are used to demonstrate the validity and accuracy of the proposed methodology.

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