Abstracts

A surface impedance approach for modeling multilayer conductors in FDTD

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Surface impedance boundary conditions (SIBC's) are implemented in the finite-difference time-domain (FDTD) method to analyze the electromagnetic field around multilayer conductors. The conducting region is replaced by an equivalent surface where SIBC's are applied locally. To incorporate the equivalent surface impedance into the FDTD code, at first the surface impedance is determined in the frequency domain by replacing the multilayer conductor by a cascade of transmission lines and calculating the total impedance matrix of the network. Following this, a wide-band polynomial approximation of the SIBC's leads to an efficient and recursive solution of the convolution integrals in the time domain. As a numerical example, the impedance matrix of a symmetric three layer conductor is derived and the scattering parameters are compared to the analytical solutions.

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