Applying the method of moments to Maxwell's equations, the two-dimensional TLM method is derived from first principles of field theory. Sampling Maxwell's equations with pulse functions yields three discretized field equations for the three electric and magnetic field components at the center of a TLM cell. For the field components at the cell boundaries, the mean values of the field components in the two neighbouring TLM cells are taken. The authors call these mean values the cell boundary mean (CBM) values. Introducing the CBM values of the electric and magnetic field components yields four discretized field equations per TLM unit cell. Applying the cell boundary mapping, they obtain four discretized field equations for wave amplitudes which determine the scattering matrix of the two-dimensional TLM method uniquely.
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