Abstracts

A Frequency-dependent FDTD Method for Induced-Current Calculations for a Heterogeneous Model of the Human Body

O.P. Gandhi, J.Y. Chen and C.M. Furse. "A Frequency-dependent FDTD Method for Induced-Current Calculations for a Heterogeneous Model of the Human Body." 1992 MTT-S International Microwave Symposium Digest 92.3 (1992 Vol. III [MWSYM]): 1283-1286.

A weakness of the FDTD method is that dispersion of the dielectric properties of the scattering/absorbing body is often ignored and frequency-independent properties are generally taken. While this is not a disadvantage for CW or narrow-band irradiation, the results thus obtained may be highly erroneous for short pulses where ultrawide bandwidths are involved. We have developed a new differential equation approach which can be used for general dispersive media for which epsilon*(omega) and μ*(omega) may be expressible in terms of rational functions, or for human tissues where multiterm Debye relaxation equations must generally be used. The method is illustrated by means of one- and three-dimensional examples of media for which epsilon*(omega) is given by a multiterm Debye equation and for a dispersive model of the human body.

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