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**Equivalent Theory and Determination of Effective Permittivity and Permeability of Metamaterials** SIMIN FENG, Naval Air Warfare Center, China Lake, California — Most electromagnetic metamaterials are fabricated layer-by-layer. This renders metamaterials intrinsically anisotropic. It is difficult to retrieve bulk material parameters through a single layer of unit cells. It has been found that retrieved material parameters often depend on the thickness of the sample due to coupling between layers. To efficiently characterize metamaterials, it is of prime importance to accurately retrieve material parameters through a single layer of unit cells. In this talk, we apply equivalent theory to general design criteria of metamaterials unit cell and material parameters extraction. Currently popular retrieving method (Phys. Rev. B 65, 195104 (2002)) often encounters antiresonance phenomenon. We introduce a new technique to retrieve effective metematerial parameters. Our method is based on the traditional retrieving method (Phys. Rev. B 65, 195104 (2002)), however, our method not only can resolve the longstanding antiresonance mystery, but also can determine ordinary and extraordinary permittivities and permeabilities simultaneously.

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