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Uniaxial Anisotropic Substrate Effects on the Resonance of an Equitriangular Microstrip Patch Antenna

L. Djaouablia, I. Messaoudene, A. Benghalia

Abstract: Using a new combined approach, the effect of the uniaxial anisotropic dielectrics on the resonant frequency and radiation field of an equi-triangular patch antenna is presented in this paper. The problem is analysed in the spectral domain using the moment method and an electric field integral equation combined with a mathematical approach. However, the dyadic Green's functions corresponding to the proposed structure are separately developed and the Fourier transform of the basis current components are calculated mathematically using 'the reference element' method. Numerical results show that the change in the resonant frequency and the radiation patterns of the antenna is due primarily to a small disturbance of the substrate's nature. Then the effect of the uniaxial anisotropic materials is a significant parameter and most essential on the microstrip antenna characterization.

Keywords : Uniaxial anisotropic dielectric, moment method, spectral domain