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ABSTRACT

In wireless communication system microstrip antenna is the key component. Popular shapes of patch for microstrip are rectangular, triangular and circular. A new transformation design formulae for feed line of rectangular microstrip antenna by using equivalent design concept were presented by the authors. That says one designed antenna for a given

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Transformation of Design Formulae for Feed Line of Triangular Microstrip Antenna

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Abstract. In wireless communication system microstrip antenna is the key component. Popular shapes of patch for microstrip are rectangular, triangular and circular. A new transformation design formulae for feed line of rectangular microstrip antenna by using equivalent design concept were presented by the authors. That says one designed antenna for a given frequency on any substrate can be transformed into another substrate material for the same design frequency by simply multiply a factor ψ to the all dimensions of patch, length of feed line and some power of ψ for feed line width (where ψ is the square root of the ratio of dielectric constants of those two designs). This paper presents that the same formulae of that rectangular transformation feed line can also be applicable for triangular shape microstrip antenna transformation. The process was repeated for the triangular shape patch microstrip antenna as applied for rectangular shape and the simulation results were surprisingly the same for it by applying the same transformation formulae.

INTRODUCTION

The classical formulae [1] are usually used for designing the patch of microstrip antenna. The formulae are very complicated and also lengthy to remember. New design formulae of rectangular microstrip antenna for transformation of design have been developed. The formulae are as follows [2].

$$W_{p2} = (\Psi)W_{p1} \quad (1)$$

$$L_{e2} = (\Psi)L_{e1} \quad (2)$$

$$\Delta L_2 = (\Psi)\Delta L_1 \quad (3)$$

$$L_{p2} = (\Psi)L_{p1} \quad (4)$$

With the condition that $h_2 = (\Psi)h_1$

Where scaling factor $\Psi = \sqrt{\frac{\varepsilon_{r1}}{\varepsilon_{r2}}}$

Here ε_{r1} and ε_{r2} are the dielectric constants of the two materials. ε_{r1} is of the known design material and ε_{r2} is of the material into which the design has to transform. Also W_{p2} and W_{p1} are the width of the patch, L_{e2} and L_{e1} are the electric lengths of the patch, ΔL_2 and ΔL_1 are the extensions in length of the patch, L_{p2} and L_{p1} are the physical length of patch and h_2 and h_1 are the substrate heights.

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