Abstracts

Stokes Phenomenon in the Development of Microstrip Green's Function and its Ramifications (Short Papers)

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In this paper we examine the effect of truncating an infinite asymptotic series for the Hankel function used in microstrip antenna calculations. In particular, the accuracy of this truncated asymptotic expansion of the Hankel function is examined from a numerical viewpoint. This expansion has been used in the literature to obtain closed-form expressions for the microstrip Green's function for subsequent use in calculating mutual coupling between elements in a microstrip array. In this paper, we show that truncating the asymptotic series for the Hankel function could lead to severe unexpected errors for those values of the argument where the asymptotic expansion is normally expected to be valid. This is known as the Stokes phenomenon and has generally remained obscure in the literature. Since the large argument of the Hankel function is shown to he related to the lateral separation between two antennas, the results presented here have a particular bearing in calculating mutual coupling between widely separated elements in electrically large microstrip arrays.

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