

NULL GENERATION USING FAR FIELD PARASITIC ELEMENT

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Generation of a null in patterns of antennas is a common problem in modern electromagnetic projects. Wireless communications and radars are two examples of such fields. In spite of the fact that almost all of researchers have paid attention to array antennas, we faced the problem of generating null in ordinary antennas.

A single antenna can be designed to produce a null in an arbitrary direction, when the null term is considered in the designing goal. Using the following method, the distance and angle in which a parasitic element should be placed to suppress the pattern of any antenna in an arbitrary direction can be determined. Expanded formulas can describe the theory for two or more nulls in two or three dimensional patterns using more parasitic elements. In this paper the problem of generating a null in a 2D pattern of predefined antenna using a parasitic element is considered.

In order to find the distance and direction which a parasitic element should be placed, the magnitude and phase of the radiated field in the null directions is forced to be zero. Thus two resulted equations for phase and magnitude are calculated and simplified and then should be solved simultaneously.

In order to check this theoretical equations, two-element dipole array antenna which is fed evenly is considered and a half wave rod is designed to generate a null in one direction of the active antenna. In addition, some observations in computer simulations is concluded. Simulation results are compared with analytical formulas and show suitable agreement.

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