

Preface

The scattering characteristics of phased arrays depend on the reflections a signal undergoes while traveling through the antenna array system including the feed network. One of the approaches being used is to trace the signal path step-by-step and calculate the reflection and the transmission coefficients at each component level and then coherently sum the contributions to arrive at array RCS. For large phased arrays and feed network with multiple coupler levels, the computations become too complicated. In order to avoid such complexity, in this book, radar cross section (RCS) of a parallel-fed linear and planar dipole array is derived using an approximate method. The RCS is expressed in terms of array factor, neglecting phase terms. The impinging signal travels through the antenna system passing through radiators, phase shifters, couplers before reaching the receive port of the feed network. It undergoes reflection and transmission at various levels of feed network due to impedance mismatches. The mutual coupling effect is included in the RCS formulation. The dependence of the RCS pattern on the design parameters, viz., antenna elements, geometric configuration, inter-element spacing, beam scan angle, and components like phase shifters, couplers, terminating impedance is analyzed.

This book presents a detailed formulation for RCS of dipole arrays along with parametric analysis. It provides an insight for graduate and research students, scientists, and academicians for estimation and optimization of RCS of phased arrays with other types of antenna elements in arbitrary geometrical configuration.

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RCS Estimation of Linear and Planar Dipole Phased
Arrays: Approximate Model

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