Singh / Jha / R.
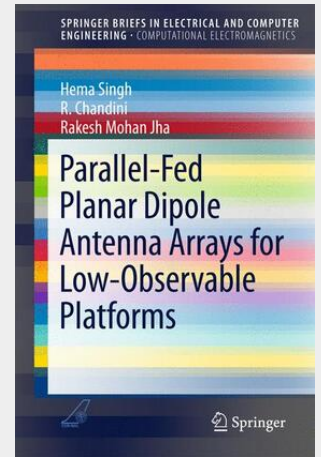
Parallel-Fed Planar Dipole Antenna Arrays for Low-Observable Platforms

This book focuses on determination of scattering of parallel-fed planar dipole arrays in terms of reflection and transmission coefficients at different levels of the array system. In aerospace vehicles, the phased arrays are often in planar configuration. The radar cross section (RCS) of the vehicle is mainly due to its structure and the antennas mounted over it. There can be situation when the signatures due to antennas dominate over the structural RCS of the platform. This necessitates the study towards the reduction and control of antenna/ array RCS. The planar dipole array is considered as a stacked linear dipole array. A systematic, step-by-step approach is used to determine the RCS pattern including the finite dimensions of dipole antenna elements. The mutual impedance between the dipole elements for planar configuration is determined. The scattering till second-level of couplers in parallel feed network is taken into account. The phase shifters are modelled as delay line. All the couplers in the feed network are assumed to be four port devices. It is shown that the array RCS can be reduced considerably for a low observable platform by an optimization of array design parameters even in the presence of mutual coupling. This book presents a systematic step-by-step analytical formulation for RCS of planar half-wavelength centre-fed dipole arrays through various schematics and illustrations. The analytical description and analysis provided in this book should be useful forstudents, researchers, and design engineers of phased arrays.

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53,49 €
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