Antenna Design and Visualization Using MATLAB: (Version 2.0 with Source Code)

By Atef Elsherbeni, Matthew Inman

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In the course of designing antennas and antenna arrays, it is often advantageous to be able to visualize the radiation patterns, examine these patterns in a variety of ways, observe antenna performance over a wide variety of situations, and determine the antenna or antenna array's constituent parameters. ADV was developed to be an interactive program for the visualization, design, and synthesis of antennas and associated arrays.

This program allows for the design and visualization of both single elements and of arrays of common elements based on assumed, known, or user provided patterns. The visualization options in the program allow for the inspection of the radiation pattern in full 3-D or in multiple 2-D and 3-D plane cuts. A great advantage is gained by being able to quickly and efficiently examine the radiation pattern in many different ways. The ability to examine the different radiation characteristics for many common types of antennas and arrays enhances the educational value of this package.

ADV allows for the design of many common types of elements, such as dipoles, loops, helixes, apertures, bi-conical, and corner reflectors. For each of these different element types, the user is allowed to change any number of parameters that define the antenna and its operation within specified limits. The program also allows the user to design, synthesize, and visualize various configurations of 1-D, 2-D, 3-D arrays and arbitrary system of array elements.

Key Features:

* Comprehensive list of various types of antenna elements
* Analysis of 1D, 2D, and 3D antenna arrays
* Several models of antenna synthesis techniques
* Graphical representation of far field qualities in 2D and 3D
* User defined plane cuts for the 3D pattern

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Editorial Review

About the Author
Atef Elsherbeni is a full Professor of Electrical Engineering at the University of Mississippi and Director of the School of Engineering CAD Lab. He is Editor-in-Chief and Managing Editor of the Applied Computational Electromagnetics Society (ACES) Journal, Editor of the Journal Of Electromagnetic Waves and Applications, Associate Editor of The Radio Science Journal, and coauthor of the book MATLAB Simulations for Radar Systems Analysis. Dr. Elsherbeni earned Bachelors degrees in both EE and Applied Physics, as well as his Masters degree in EE, at Cairo University. He earned his doctorate and was a post-doctoral Fellow at the University of Manitoba.

Matthew Inman earned his Bachelor's and Master's degrees, and is a doctoral student, at the University of Mississippi under Prof. Elsherbeni. He has been teaching undergraduate classes, such as Digital Systems, all Digital Systems Labs, Computer Aided Design in EE, and High-Frequency and Microwave Lab. He has contributed to eight conference paper presentations and one refereed journal paper. His current research interests are in antenna simulation, electromagnetic theories and numerical modeling.

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