

UCLA Electrical Engineering ARR 2011

Session 8. Novel Antennas West Coast Room

1:15-1:40

"Directivity Enhancement of Offset-Fed Reflectarray Antennas Employing Dipole Type Radiating Elements"

Jordan Budhu and Yahya Rahmat-Samii

Abstract:

Microstrip Reflectarray Antennas are becoming more widely used in applications where a traditional parabolic reflector would be. In order to provide comparable performance, the Reflectarray antenna must provide similar pattern characteristics. When an offset feeding arrangement is chosen in conjunction with dipole type radiating elements, several factors must be considered in the design in order to achieve optimum pattern performance. This presentation will overview these design choices, the impact they have on pattern performance and overall directivity, and provide guidelines which can be used in the initial design planning stage of these types of antennas.

1:40-2:05

"Dual-Band CRLH Phased-Array Feed Network"

Jun Choi and Tatsuo Itoh

Abstract: Composite right/left-hand based all passive dual-band phased array antenna feed network is presented. CRLH structures are capable of exhibiting phase lead or lag responses. This allows all-passive single feeding network that supports dual-band operation with wider separation between the radiated angles compared to the conventional all-passive delay lines. Arbitrary beam angles for each band can be easily designed and implemented. Measured results of the CRLH dual-band feed network and four-element phased-array antenna using CRLH feed network show good agreement with the theoretical results.

2:05-2:30

"C-shaped, U-shaped and E-shaped Patch Antennas in Wireless Application- A comparative Study"

Shubhendu Bhardwaj and Yahya Rahmat-Samii

Abstract:

Slotted patch antennas have gained their popularity in wireless communication frequency band (1.9GHz-2.4GHz), due to their high bandwidth and miniaturized size. These antennas can have varying characteristics depending on the position and orientation of slot. Here, three popular types of slotted antennas are compared with respect to their RF mechanism, radiation mechanism, bandwidth, size and cross-polarization characteristics for same operational frequency. It is found that C-shaped and double C-shaped antennas, even though miniaturized, suffer from narrow bandwidth and high cross-polarization. U-slotted and E-shaped patch antennas can achieve wider bandwidth with minor penalty in size and cross-polarization.

2:30-2:55

"MEMS Reconfigurable E-Shaped Patch Design using Particle Swarm Optimization"

Joshua Kovitz, Harish Rajagopalan, and Yahya Rahmat-Samii

Abstract:

A septum is an effective polarizer to generate circular polarization from a linear excitation in a rectangular waveguide. Using full-wave simulations, a graphical visualization is presented to aid in better understanding the fundamental principles of a stepped septum circular polarizer. Previous designs for septum polarizers have used simple trial and error methods, which are not always optimal for multi-objective operations. In this research, we propose a novel septum design through the use of Particle Swarm Optimization (PSO), a global nature-inspired optimization technique. This design utilizes modified Sigmoid functions to define its contour within the discontinuous region. These functions allow another degree of freedom to control each step's smoothness in order to achieve better impedance matching, axial ratio, and bandwidth.