Abstract

Present-day wireless communication requires high performance antenna systems having conformal shape, aerodynamic profile, compact size, uncomplicated design and simple manufacturability. Moreover, such systems should be lighter in weight as well as cost effective too. In case of fixed-satellite communication as well as maritime radio-navigation, the situation becomes even more demanding in respect of these requirements. However, to meet these requirements, printed micro-strip patch technology is used frequently in these days for the fabrication of such high performance antenna systems. However, printed microstrip antennas usually suffer from the drawbacks of having lower gain and/or lower bandwidth as well as return loss. In order to address these issues, the present paper reports on the design of a small-sized 2×2 Element Sierpinski Carpet Fractal Antenna Array using swarm-inspired Dragonfly Optimization. Proposed antenna array operates efficiently at 5.6 GHz, 7.4 GHz and 10.7 GHz with an achievement of 202MHz, 470MHz, and 883MHz bandwidths respectively for the specified spectrum bands. In order to bring about substantial improvement in the performance of the designed antenna array, Dragonfly Optimization is executed in combination with
Polynomial Curve-fitting method for optimizing three different geometrical dimensions of unit antenna element in the proposed system. The results of present study are quite promising.

References

http://orbanmicrowave.com/the-basic-of-antenna-arrays/  

Index Terms

Computer Science  Communications

Keywords

Microstrip, antenna, fractal, dragonfly, optimization, sierpinski carpet geometry and patch.