Publications Template

#	Research Title	Field	Abstract	Year of Publication Publishing	Publishing Link "URL"
1	Design of thinned fractal antenna arrays for adaptive beam forming and sidelobe reduction	Smart Antenna Arrays	This study introduces, for the first time, a new design methodology that combines the unique multi-band features of thinned fractal antenna arrays with the adaptive beamforming requirements. The major challenges of fractal array design are the high sidelobe level (SLL), the huge number of elements at higher-growth stages, and the radiation pattern synthesis. In this study, the ant colony optimisation algorithm is utilised for thinning fractal arrays by estimating the optimum combination of 'on' and 'off' elements corresponding to lowest	2018	https://ietresearch.onlinelibrary.wiley.com/doi/full/10.1049/iet-map.2017.0464

			possible SLL, while the least mean square algorithm is investigated as an adaptive beamforming method in the proposed design. The capability of the proposed design is demonstrated by investigating hexagonal and pentagonal fractal antenna arrays under various parameter regimes. The results show that the proposed design is much superior in terms of multi-band frequency operation, array element reduction, and beamforming accuracy. This reveals the effectiveness of the proposed technique as a promising design in smart antenna technology.		
2	Adaptive beamforming synthesis for thinned fractal antenna arrays	Modern Signal processing Techniques	Fractal antenna array is a compact and multi-band antenna-element design technique. One of the major challenges of this array design is the	2017	https://ieeexplore.ieee.org/abstract/document/8105131

			possibility of radiation pattern synthesis. In this work, the Least Mean Square (LMS) algorithm is investigated as an adaptive beamforming method in the design of thinned fractal antenna arrays for the first time. This array design is developed by estimating the active fractal array elements corresponding to the desired radiation pattern main lobe and nulls, while maintaining the same Side Lobe Level (SLL) at multiple frequency bands. The capability of the proposed method is demonstrated by considering linear cantor and Sierpinski carpet fractal antenna arrays. The results show that the proposed antenna array design is much superior in terms of multi-band frequency operation, array element reduction, and beamforming		

			accuracy. This reveals the effectiveness of the proposed algorithm as a promising design technique in the smart antenna technology.		
3	Generator optimization for thinned fractal hexagonal and pentagonal antenna arrays using Ant Colony algorithm	Smart Antenna Arrays	Unique properties of fractals are utilized in a new class of antenna-element designs, called fractal antenna arrays that are multi-band and compact in size. This paper investigates the use of Ant Colony Optimization (ACO) algorithm for thinning fractal antenna arrays by estimating the optimum combination of “on” and “off” elements corresponding to lowest possible Side Lobe Level (SLL). The ACO method is employed to determine the suitable excitation amplitude for each element of the subarray generator, allowing maximum SLL reduction. In order to demonstrate the effectiveness of the	2017	https://ieeexplore.ieee.org/abstract/document/7893462

			proposed method, hexagonal and pentagonal arrays with 6-element concentric circular ring subarray generator are investigated with and without the ACO method. The ACO results are compared with those obtained for the arrays in which all the elements are turned “on”, and the results show the superior performance of the proposed method.		
4	A new adaptive beamforming of multiband fractal antenna array in strong-jamming environment	Modern Signal processing Techniques	This paper proposes, for the first time, a new radiation pattern synthesis for fractal antenna array that combines the unique multi-band characteristics of fractal arrays with the adaptive beamforming requirements in wireless environment with high-jamming power. In this work, a new adaptive beamforming method based on discrete	2022	https://link.springer.com/article/10.1007/s11277-022-09745-4

			cbKalman filter is proposed for linear Cantor fractal array with high performance and low computational requirements. The proposed Kalman filter-based beamformer is compared with the Least Mean Squares (LMS) and the Recursive Least Squares (RLS) techniques under various parameter regimes, and the results reveal the superior performance of the proposed approach in terms of beamforming stability, Half-Power Beam Width (HPBW), maximum Side-Lobe Level (SLL), null depth at the direction of interference signals, and convergence rate for different Signal to Interference (SIR) values. Also, the results demonstrate that the suggested approach not only achieves perfect adaptation of the		

			radiation pattern synthesis at high jamming power, but also keep the same SLL at different operating frequencies. This shows the usefulness of the proposed approach in multi-band smart antenna technology for mobile communications and other wireless systems.		
5	Synthesis of Wideband Thinned Eisenstein Fractile Antenna Arrays with Adaptive Beamforming Capability and Reduced Side-Lobes	Modern Signal processing Techniques	A modern design of fractal antenna arrays, called fractile array, which exhibits a fractal boundary contour within a tiled plane, is explored for enhanced array performance. In this paper, the Eisenstein fractile array is introduced to exploit the unique geometrical features of fractiles that allow multiband and wideband operation and avoid grating lobes in the radiation pattern even, in some cases, when the array elements' spacing	2022	https://ieeexplore.ieee.org/abstract/document/9954365

			is greater than the half wavelength. To alleviate the large number of elements and the high Side-Lobe Level (SLL) occurred at large scales, the Genetic Algorithm (GA) optimization technique is considered for thinning the proposed antenna array by estimating the optimal set of “on” and “off” elements corresponding to the minimum SLL without degrading the directivity of the radiation pattern. Also, the proposed array configuration is designed with adaptive beamforming capability using the Least Mean Square (LMS) technique. The effectiveness of the proposed GA-LMS approach is investigated by performing several MATLAB simulations under various set of array configurations. Results reveal that the		

			suggested thinned Eisenstein fractile antenna array using GA-LMS approach is superior in terms of multiband and wideband performance, array element reduction, SLL reduction, grating lobe elimination, and beamforming capability. This elucidates the robustness of the suggested thinned Eisenstein fractile array as a promising design for multiband, wideband, compact, inexpensive, and adaptive smart antennas in modern wireless systems.		
6	New Wideband Antenna Arrays with Low Sidelobe Based on Space Filling Curves	Smart Antenna Arrays	This paper introduces a new design of wideband planar antenna arrays based on space-filling curves with low Side-Lobe Level (SLL). The unique geometrical features of such arrays are exploited to provide wideband operation and to avoid grating lobes in	2023	https://ieeexplore.ieee.org/abstract/document/10066930

			the radiation pattern even when the minimum spacing between elements is increased to one-wavelength. Three antenna array configurations based on space-filling curve, namely heighway dragon, twindragon and Z_2 heighway dragon arrays, are investigated and compared for various set of parameter regimes. Results reveal that the introduced array designs offer several highly desirable radiation pattern advantages over their conventional periodic planar array counterparts, including wideband operation, SLL reduction, and grating lobe elimination. This demonstrates the importance of the introduced array configuration as a promising design in modern wireless systems.		