

Design Of Adaptive Arrays Based On Element Position Perturbations

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Summary

Null steering in adaptive arrays by element position perturbations has been investigated. The results showed that it is possible to steer array nulls in the directions of interfering signals by perturbing the element positions of linear arrays, provided that the number of interfering signals is less than half the number of array elements. Arrays with different number of elements and various illumination functions were investigated. The main advantage of using this technique over the other commonly used methods is that the amplitudes and phases of the array elements can be used mainly to steer the main beam towards the desired signal. The authors report on the design of a digital feedback control system to provide null steering by controlling the array element positions automatically. The array comprises a signal processor, digital control algorithm (PID), stepper motors, shaft encoders, actuators and multiplexers. The proposed adaptive system is used to form automatically the required nulls in the direction of arrival of the interference. The design has been tested on arrays of three, five and eight elements. The simulation results show the effectiveness of this technique

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