Linear Frequency Diverse Arrary Receiver Architectures

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Abstract

Typical radar systems are limited to energy distribution characteristics that are range independent. However, operators are generally interested in obtaining information at particular ranges and discarding elsewhere. It seems appropriate then to attempt to put energy solely at the range(s) of interest, thus minimizing exposure to clutter, jammers and other range-dependent interferences sources. The frequency diverse array (FDA) can provide a mechanism to achieve range-dependent beamforming and the spatial energy distribution properties are investigated on transmit and receive for different architectures herein.

Frequency diverse array radar utilizes the principle of superposition to cohere energy, in a novel fashion, to achieve range dependent spatial patterns. While the theory for transmit spatial patterns has been developed, the need for efficient receiver design architectures persists. This talk will give in introduction to the FDA concept and investigate three basic receive chain architectures for their spatial patterns and design complexity in a benign environment with a single point target. Additionally, closed-form expressions of all receive patterns will be given.

Biography

Aaron Jones received the B.S. in Engineering Physics and M.S. in Electrical Engineering from Wright State University in 2007 and 2011, respectively. He is currently pursuing the Ph.D. in Electrical Engineering at Wright State, focusing on waveform design and optimization under the advisement of Dr. Brian D. Rigling. Mr. Jones is employed by the Air Force Research Laboratory as a Research Physicist working on novel beamforming techniques, MIMO radar and waveform diversity architectures.