

Sintesi di array di grandi dimensioni con sub-array - Analisi complessità vs. performance

C. Fossi

Abstract

La realizzazione di sistemi radianti per applicazioni di tipo radar o satellitare può richiedere l'utilizzo di array di grandi dimensioni. Al fine di generare diagrammi di radiazione "ottimali" che permettono di ridurre la potenza delle interferenti raccolta dall'antenna, si utilizzano eccitazioni non uniformi, una per ciascun elemento dell'array. I problemi che sorgono in questo caso sono legati alla complessità nella realizzazione della rete di alimentazione (in quanto ogni singolo elemento deve essere alimentato in modo opportuno) ed ai costi.

Al fine di evitare tali problemi, una tecnica largamente impiegata è quella del sub-arraying. Tale tecnica si basa sul raggruppamento degli elementi in sotto-gruppi (sub-array). A ciascun sub-array viene assegnata un'unica alimentazione calcolata in modo opportuno al fine di soddisfare i requisiti di progetto. Recentemente, è stata presentata in letteratura una tecnica che permette di risolvere in modo efficiente tali problemi, ovvero:

- (a) fare il design dei sub-array (definire il modo in cui raggruppare gli elementi in sub-array);
- (b) definire le alimentazione ottima per i sub-array.

È evidente che esiste un compromesso tra la complessità circuitale dell'antenna (numero di sub-array impiegati) e le performance dell'antenna. L'obiettivo di tale progetto è quello di analizzare varie soluzioni compromesso (dette soluzioni Pareto ottimali) e quale è l'impatto del numero di sub-array utilizzati nella schiera sulle performance del sistema radiante.

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Supervisors: Prof. A. Massa, Dr. L. Manica, Dr. P. Rocca.*