

Simulazione Di Array Per Radioastronomia Basati Su ADS

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Abstract

La radioastronomia è l'osservazione dei corpi celesti mediante la misura della loro emissione di onde radio. A causa della lunghezza d'onda molto più grande rispetto alla luce visibile, e la potenza molto ridotta delle sorgenti celesti, tale osservazione si basa sull'utilizzo di antenne di grandi dimensioni combinate per formare un'array. Inoltre, al fine di aumentare la dimensione efficace dell'array, tali sistemi si basano sulla correlazione dei segnali ricevuti. Al fine di massimizzare le prestazioni della schiera di antenne riducendone la ridondanza, i costi e la complessità, la progettazione di array per radioastronomia si basa sulla selezione ottimizzata delle posizioni degli elementi radianti. In questo ambito, il gruppo ELEDIA ha sviluppato metodologie di design analitiche basate su Almost Difference Sets in grado di garantire a-priori prestazioni elevate in termini di ridondanza e caratteristiche radianti dell'array risultante, e tempi di design estremamente contenuti anche nel caso di array di grandi dimensioni. Attualmente tali metodologie forniscono prestazioni soddisfacenti nel caso di geometrie lineari, ma non sono state ancora approfondite le loro prestazioni nel caso di array planari. Scopo dell'attività di verifica è perciò quello di analizzare le prestazioni degli array per radioastronomia basati su ADS nel caso di geometrie planari, e di valutarne vantaggi e limitazioni.

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