

# Failure Robustness Di Thinned Arrays Basati Su Almost Difference Sets

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## Abstract

Gli array per applicazioni quali radar, remote sensing, imaging biomedicale, e comunicazioni satellitari e terrestri spesso devono esibire elevata direttività e bassi livelli di lobo secondario. L'utilizzo di array filled (in cui gli elementi sono spazati regolarmente) permette di ottenere tali prestazioni, ma con costi e complessità realizzative spesso non accettabili. Per tale ragione, sono state sviluppate negli ultimi decenni numerose tecniche di "array thinning", il cui obiettivo è sintetizzare array con pari prestazioni rispetto agli array filled ma con un numero limitato di elementi.

In questo ambito, recentemente è stata proposta e validata numericamente una tecnica di thinning basata sugli Almost Difference Sets, in grado di garantire eccellenti prestazioni in termini di livello di lobo secondario con tempi di design estremamente contenuti. Per tali classi di array sono inoltre disponibili stime a priori sulle prestazioni attese: tali strumenti sono fondamentali per il loro utilizzo. Il comportamento degli ADS-based arrays in applicazioni reali, specie se satellitari, richiede però anche la conoscenza di quale sia il loro comportamento in presenza di difetti di realizzazione e di guasti agli elementi radianti (failure). In questo momento non è infatti nota la sensibilità di tali design alla failure degli elementi.

Scopo della presente attività è quello di analizzare la robustezza dei thinned arrays basati su ADS in presenza di guasti (failure) degli elementi radianti. L'attività si propone di elaborare linee guida in termini probabilistici dell'andamento del peak sidelobe level in presenza di failure per array lineari di dimensioni e thinning arbitrario.

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