

# Sintesi Di Antenne A Schiera Adattive Basate Su Time-Modulation

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## Abstract

In molte applicazioni è necessario poter sagomare il pattern della potenza radiata dall'antenna, in modo da massimizzare la potenza del segnale utile e minimizzare la potenza associata ad eventuali interferenti in ricezione, posizionando quindi dei nulli in determinate direzioni di radiazione. In quest'ambito, sono state proposte in letteratura molte tecniche che propongono una sintesi su ampiezza e fase di eccitazione degli elementi, oppure sulla sola fase, massimizzando il "Signal to Interference plus Noise Ratio" (SINR) oppure minimizzando la potenza totale radiata in uscita dall'antenna.

In questo scenario, è stata recentemente proposta in letteratura una tecnica per il nulling basata su time-modulated linear array: rispetto alle antenne convenzionali, i time-modulated array introducono un ulteriore grado di libertà (il tempo) nel processo di sintesi; questo permette da un lato di aumentare la flessibilità nel design dell'antenna, dall'altro di poter riconfigurare il fascio andando ad agire solamente sul tipo di modulazione temporale utilizzata. Il principale problema legato a questo tipo di tecnica basata su modulazione nel tempo riguarda la generazione di segnali indesiderati a frequenze multiple della frequenza di modulazione che implicano uno spreco di potenza.

La tecnica proposta per la presente attività è basata su time-modulation e consiste nella massimizzazione del SINR mediante l'algoritmo di ottimizzazione PSO (a differenza della tecnica proposta in letteratura, basata sulla minimizzazione della potenza totale in uscita dall'antenna) e nella contemporanea minimizzazione della sideband radiation. Lo scopo è quello di valutare le performance della tecnica in questione, effettuando un confronto sulla base dei risultati ottenuti con le varie tecniche proposte in letteratura.

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