

# Sintesi Di Time-Modulated Arrays Con Direttività Istantanea Costante

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## Abstract

I time modulated arrays si stanno rivelando una valida alternativa ai più classici phased-array per la sintesi di array di antenne in cui sia necessario poter sagomare il fascio della potenza radiata ed avere un comportamento ben definito del lobo principale e dei lobi secondari. Rispetto alle antenne convenzionali i time-modulated array sfruttano una quarta dimensione, il tempo, nel processo di sintesi. Questo permette di aumentare la flessibilità nel design dell'antenna e di poter riconfigurare il fascio agendo solamente sulla modulazione temporale utilizzata. Ciascun elemento dell'antenna infatti è eccitato mediante una sequenza periodica di impulsi, le cui durate rappresentano i parametri su cui agire per sintetizzare il pattern radiato alla frequenza di lavoro. Tale caratteristica comporta però la generazione di segnali indesiderati a frequenze multiple della frequenza di modulazione che rappresentano uno spreco di potenza. Inoltre, il pattern radiato istantaneamente dall'antenna varia in quanto il numero e la configurazione degli elementi attivi varia con la sequenza di modulazione.

E' già stato mostrato in letteratura come lo shift temporale degli impulsi all'interno del periodo di modulazione permetta di migliorare le performance dell'antenna, in termini di direttività istantanea ed in termini di Sideband Level. L'obiettivo di questo progetto è quello di sintetizzare un pattern alla frequenza di lavoro con caratteristiche ben definite di termini di Sidelobe Level, mantenendo la direttività istantanea costante e minimizzando contemporaneamente lo spreco di potenza. L'approccio di ottimizzazione si basa un algoritmo di tipo Particle Swarm.

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