

Interval Analysis as Applied to the Robust Design of Linear Antenna Arrays

N. Anselmi

Abstract

La realizzazione fisica di una schiera di antenne comporta l'introduzione di errori sulla fase e sull'ampiezza delle eccitazioni degli elementi radianti dovuti ad imperfezioni nei singoli componenti dell'antenna e della rete di alimentazione. Ad esempio, una schiera progettata per rispettare determinati vincoli in termini di diagramma di radiazione può non soddisfare più le specifiche di progetto in presenza di tali errori. Per questo motivo la definizione di una strategia di sintesi che sia in grado di tenere conto dei limiti di tolleranza dei singoli dispositivi riveste grande importanza nelle applicazioni pratiche.

Al fine di raggiungere questo obiettivo, una possibile soluzione consiste nel

- a) tenere conto delle tolleranze dei componenti rispetto ai valori nominali definendo i pesi degli elementi dell'array come intervalli anziché come valori puntuali
- b) sfruttare l'aritmetica per intervalli per calcolare il range di valori assunti dal pattern dell'array assumendo che le eccitazioni appartengano a tali intervalli
- c) definire dei valori nominali in modo tale che l'intervallo dei pattern generati dall'antenna soddisfi i vincoli richiesti.

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