Guidelines for Student Reports

SINTESI DI UN FEEDER ADATTIVO PER ANTENNE A RIFLETTORE BASATO SU UN ARRAY DI ANTENNE ELICOIDALI PLANARI

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Abstract

Le antenne a riflettore sono ampiamente utilizzate nelle comunicazioni satellitari. In particolare nei moderni satelliti per telecomunicazioni, studiati per offrire differenti tipologie di servizi sorge la necessità di sistemi radianti in grado di ridirigere il proprio diagramma di irradiazione in modo tale da coprire differenti aree del globo terrestre. Al fine di ottenere tale risultato vengono adottate le seguenti soluzioni tecnologiche:
1) L'allineamento dell'antenna principale viene modificato agendo sui dispositivi di propulsione del satellite.
2) Si realizzano sistemi radianti costituiti da riflettori elettromagnetici opportunamente sagomati e illuminati con differenti tipologie di feeder.
3) Si realizzano feeder intelligenti basati sulla tecnica dei phased array in grado di ridirigere il main lobe.

La soluzione 1 e' poco praticata in quanto ridurrebbe drasticamente il tempo di vita del satellite mentre le soluzioni 2 e 3 anche se sono le più diffuse in particolare la soluzione 2, comportano problematiche di peso, ingombro complessità realizzative e costi eccessivi.
Un'alternativa alle suddette soluzioni potrebbe essere la realizzazione di un feeder intelligente basato su array elicoidali.
L'antenna elicoidale è di per sé uno sfasatore, la fase dell'onda EM può essere variata facendo semplicemente ruotare l'antenna sul proprio asse o variando la lunghezza delle spire. In pratica con un antenna elicoidale e' possibile realizzare sfasatori efficienti e a costi ridotti. Lo scopo del progetto e' sfruttare le caratteristiche delle antenne elicoidali per realizzare un array adattivo funzionante come un phased array. In particolare al posto di costosi sfasatori digitali verranno sfruttate le caratteristiche delle antenne elicoidali, inoltre per limitare peso e ingombro del sistema radiante verranno considerati elementi elicoidali a microstriscia.

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