Guidelines for Student Reports

Efficiency Analysis in Time-Modulated Arrays vs. Phased Arrays

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Abstract

In the last years, time-modulated arrays have gained a growing interest since they overcome some classical drawbacks of the amplitude-weight control by arbitrarily shaping the radiated pattern by means of the modulation of the static excitations with a set of radiofrequency (RF) switches. Nevertheless, two main problems have limited the consideration of this type of array in the past: the necessity to use reliable RF switches operating at high frequency, and the generation of unwanted harmonics, the so called sideband radiation (SR), which represent a loss in term of radiated power. The new generation of RF switches thanks to the recent advance in nano-technologies are able to satisfy the operative requirements; moreover, the use of global optimization algorithms have shown that the problem of the sideband radiation can be properly handled.
This project proposes an analysis of the parameters (directivity, gain and power losses) of phased and time-modulated antenna arrays for different configuration of excitations and pulse durations (to synthesize Taylor, Dolph, Zolotarev and Bayliss patterns).

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