

Analysis of quasiperiodic reflector antenna

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Abstract: A procedure for the design of a planar reflector antenna comprising a quasiperiodic metallic echelette grating is described. The reflector is designed so that the power radiated by the feed is deflected by the various portions of the reflector towards a desired direction. The possibility of steering the main beam by shifting the frequency with nearly no loss in gain is demonstrated. The sensitivity to cell fabrication errors and to improper feed location, which is essential information for the antenna designer, is examined.

et al. have analysed and demonstrated microstrip reflectarray [5, 6]. In these works, the microstrip elements of the array are adjusted to achieve constructive interference of the zeroth-order grating mode originating from the various cells.

In this paper, we investigate the behaviour of a reflector antenna comprising a quasiperiodic metallic echelette grating. The problem of periodic echelette gratings has been a subject of intensive investigation [7–9]. Here, we consider a quasiperiodic echelette grating, of finite size and study the influence of the cell structure on the gain of the antenna. It is well known that the direction of the first-order grating mode is a function of the period, the angle of incidence and the frequency. This direction, however, is not a function of