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Mathematical Model for Progressive Phase Distribution of Ku-band Reflectarray Antennas

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Abstract : Progressive phase distribution is an important consideration in reflect array antenna design which is required to form a planar wave in front of the reflect array aperture. This paper presents a detailed mathematical model in order to determine the required reflection phase values from individual element of a reflect array designed in Ku-band frequency range. The proposed technique of obtaining reflection phase can be applied for any geometrical design of elements and is independent of number of array elements. Moreover the model also deals with the solution of reflect array antenna design with both centre and off-set feed configurations. The theoretical modeling has also been implemented for reflect arrays constructed on 0.508 mm thickness of different dielectric substrates. The results show an increase in the slope of the phase curve from 4.61°/mm to 22.35°/mm by varying the material properties.

Keywords : mathematical modeling, progressive phase distribution, reflect array antenna, reflection phase
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