Improved Phase Performance for Rotman Lens

Abstract

Rotman lenses are used to obtain multiple beams from a single array. Although the beams produced by the feed antennas at focal points have no path length errors, the beams produced by feed antennas at off focal points may have large path length errors. These path length errors cause deterioration in the multiple beams. In this article, two novel methods are introduced to obtain feed curves which reduce the path length errors of off focal feed points significantly, compared with the commonly used circular and elliptical feed curves. The first method obtains feed curve points based on having zero path length error at three chosen points of the radiating array for each beam direction. The second method uses the particle swarm optimization method for obtaining optimum feed points for each beam direction. The results show that there is a very significant drop in the level of the maximum path length errors (in the order of about 1:4). © 2012 Wiley Periodicals, Inc. Int J RF and Microwave CAE 23: 634–638, 2013.

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Article *in* International Journal of RF and Microwave Computer-Aided Engineering 23(6) · October 2013 *with* 25 Reads

DOI: 10.1002/mmce.20698