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Author: Dr. Yongxuan Xiao
China Academy of Space Technology (CAST), China, xiyx@163.com

Dr. Yong XUE
China Academy of Space Technology (CAST), China, xy.afrie@gmail.com
Dr. sun bo
China Academy of Space Technology (CAST), China, alicesun126@126.com
Mrs. luan shan
China Academy of Space Technology (CAST), China, luanshanhrb@163.com
Mr. Naijin Liu
China Academy of Space Technology (CAST), China, naiking@gmail.com
Dr. Dong Chen
China Academy of Space Technology (CAST), China, phd.dchen@gmail.com

INTERFERENCE SIMULATION FOR THE SATELLITE ANTENNA REFLECTORS

Abstract

Single-aperture multiple-beam reflector antennas are new generation telecommunication satellite antennas. This antenna design forms composite beams through adding up element beams weighted by the feed excitation coefficients. Using different feed excitation coefficients, multiple beams are formed. The composite beam performance is determined by the feed excitation coefficients, and the feed excitation coefficients accuracy affects that of the composite beam patterns. Another performance parameter of multiple-beam antennas, the inter-beam isolation represented with C/I, depends on the pattern of composite beams. So the excitation coefficient accuracy also affects the C/I parameter of the multiple-beam antenna. Therefore, it is important for the design and development of multiple-beam reflector antennas to analyze the effect of excitation coefficient accuracy on the antenna performance. Using Monte Carlo methods, the effect of feed excitation coefficient accuracy on the pattern, C/I of the composite beam is analyzed through simulating a single-aperture multiple-beam reflector antenna, and the quantitative relationship curves are presented. The analysis results can be used to determine accuracy requirement of the feed excitation coefficients when the multiple-beam reflector antennas are designed and developed.