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RADIATION PATTERN EVALUATION WITH SURFACE DISTORTION ERROR IN LARGE REFLECTOR ANTENNA MOUNTED ON COMMUNICATION SATELLITE FOR HYBRID MOBILE COMMUNICATION SYSTEM

Abstract

In recent years, large satellite antenna has been developed for communications satellite. Especially, research and development of hybrid mobile communication system by using satellite and terrestrial is now proceeding. For these satellites, the reflector is deployable, stowed at lunch and deploy on orbit. Reflector may be constructed with multi-module and deployable truss structure, and have a metal mesh surface. The reflectors of these antennas are very complex but radiation pattern of antenna will be affected by surface error and distortion. With these large antennas, thermal distortion error especially can have serious implications, causing orbit beam direction errors, distortion of beam shape, and increasing sidelobe levels. This paper describes the effect of reflector surface error for radiation pattern of reflector antenna, and distortion of surface is analyzed using Zernike polynomial. The Zernike polynomial is used in optics for the investigation of aberrations.