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QUADRATIC-CURVE METHOD FOR MESH GENERATION OF OFFSET-FEED PARABOLIC MESH REFLECTOR

Abstract

Offset-feed reflector is one of research hotspots in the area of high precision mesh antennas for their attractive properties including less feed shading loss and good directivity. The surface mesh geometry is crucially important to the surface accuracy and effective aperture of mesh reflectors. Therefore, a quadratic-curve method which can significantly improve the effective aperture of offset-feed mesh reflectors was proposed in this paper. First, a general numerical method was presented to obtain nodal coordinates which satisfied defined quadratic-curves in aperture plane. Second, the spatial positions of cable net nodes were calculated according to the parabolic equation. The force density method was then used to calculate the pretension of the generated cable net. Eventually, the mesh geometry generated by the proposed design method was compared with existing mesh geometries to show its unique abilities.