

论文

面板位置误差对反射面天线功率方向图的影响机理

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摘要:

根据反射面天线分块面板的结构特点, 推导出了面板位置误差与天线口面相位误差之间的转换矩阵. 在此基础上, 研究了分块面板的平移和倾斜对于天线功率方向图的影响机理. 选择由3圈面板拼装而成的反射面天线进行案例分析, 数值仿真结果与实测数据比较显示, 相对误差小于10%, 该误差转换矩阵可应用于实际天线工程中电性能的估算以及表面精度调整等.

关键词: 反射面天线 影响机理 面板位置误差 功率方向图 误差转换矩阵

Mechanism of the influence of the panel positional error on the power pattern of large reflector antennas

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Abstract:

The errors associated with a segmented reflector limit the electrical performance obtainable with those antennas. In order to determine realistic error budgets for such antennas, approximate expressions for ETM (Error Transformation Matrix) between panel positional errors and aperture phase errors are derived. Base on the ETM, the mechnism of the influence of the panel positial errors on the power pattern of a reflector antenna with 3-ring panels is studied. It is found by comparing simulation with experimental data that the error is less than 10%. Thus the ETM may be applied to antennas with realistic panel schemes for the prediction of electrical performance and panel adjustment.

Keywords: reflector antenna influence mechanism panel positional error power pattern error transformation matrix

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