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PANEL SETTING ERROR MODAL ANALYSIS FOR PRECISION RADIO TELESCOPES

Abstract

In this work, panel setting error modal analysis on the optical system of a 25-m parabolic-shaped radio telescope antenna is performed. The effects of panel segment setting errors, such as piston, tip, tilt, radial, azimuth, and twist displacements, were directly derived. The antenna performance was then evaluated using the standard Strehl ratio expression. Various panel setting error effects were illuminated graphically after Monte Carlo simulations of complete ensembles of the antenna panel setting modal errors. The results show that the piston error is dominant in overall distortion effect while the twist error is least important. The study therefore suggests the design of adjusters which are more sensitive in the piston direction and least sensitive in the twist direction.