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Titre :

NAROO program : Analysis of USNO Galilean observations 1967-1998

Abstract :

The New Astrometric Reduction of Old Observations (NAROO) program is dedicated to the measurement of astrophotographic plates and the analysis of old observations for scientific purposes. One of the main objectives is to provide accurate positional measurements of planets and satellites to improve our knowledge of their orbits and dynamics, and to infer the accuracy of the planet and satellite ephemerides.

We digitized 553 astronegatives of the Galilean satellites taken with the McCormick and the U.S. Naval Observatory 26-inch refractors from 1967 to 1998, resulting in 2650 individual observations. We measured and reduced these observations through an optimal process that includes image, instrumental, and spherical corrections using Gaia-DR3 catalogue to provide the most accurate equatorial (RA, Dec) ICRS positions.

We compared the observed positions of the satellites with the theoretical positions from different planetary ephemerides and satellite ephemerides. 4819 positions of the Galilean satellites have been determined with an accuracy of 55 mas or 160 km at Jupiter, indicating that the limits of the photographic techniques were now reached.