

ORIENTATION OF FK4 SYSTEM FROM MERIDIAN OBSERVATIONS OF PLANETS

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ABSTRACT

The orientation of the FK4 coordinate axes was made by two methods: using the classical interpretation of the orientation problem and by the new method suggested and developed at the Main Astronomical Observatory.

The orientation elements of the FK4 were obtained using 11232 meridian observations of Mercury, Venus, Mars and 5987 observations of Ceres, Pallas, Juno and Vesta made at six observatories between 1928 and 1971. The pseudo-perturbation method was used for the adjustment of the ill-conditioned system of the equations.

The computations showed that the new method for orientation of the axes of star catalogues is efficient and the usefulness of the pseudo-perturbation method has been ascertained.

The following values of the equinox and equator corrections of the FK4 have been obtained using:

the new method (14 unknowns)

arithmetical means
over the planets

$$\Delta A = + 0^{\text{S}}.028 \pm 0^{\text{S}}.014$$

$$\Delta \delta_{\text{O}} = + 0''.016 \pm 0''.030$$

weighted means
over the planets

$$\Delta A = + 0^{\text{S}}.013 \pm 0^{\text{S}}.005$$

$$\Delta \delta_{\text{O}} = + 0''.021 \pm 0''.024$$

the classical method (12 unknowns)

arithmetical means
over the planets

$$\Delta A = + 0^{\text{S}}.028 \pm 0^{\text{S}}.014$$

$$\Delta \delta = + 0''.024 \pm 0''.030$$

weighted means
over the planets

$$\Delta A = + 0^{\text{S}}.016 \pm 0^{\text{S}}.008$$

$$\Delta \delta_{\text{O}} = 0''.042 \pm 0''.023$$