

ABSOLUTE DETERMINATIONS OF STAR DECLINATIONS FROM POLE TO POLE

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The most widely spread method of determination of star declinations is Bessel's method. Although it gives good agreement between star declinations obtained from observations of stars in upper and lower culminations, it leads to great systematic errors if the system of the instrument has an error of the type

$$\Delta z = a \sin z \quad \text{or} \quad \Delta z = a \sin 2z,$$

such as flexure or errors of divided circle. Besides, in the determination of correction of latitude ($\Delta\phi$) and refraction ($\Delta\mu$) considerable correlation between them exists.

It should be noted that the coefficients of correlation and the errors of unknowns increase while latitudes decrease. In particular, when the place of observation is changed from Pulkovo to Kislovodsk the error of $\Delta\phi$ increases approximately two times, and the error of $\Delta\mu$ 1.5 times. When the place of observation changes from Pulkovo to Serro-Calan, the changes in $\Delta\phi$ and $\Delta\mu$ are 5 and 3 times respectively.

To find a way out of this situation several modern methods of determination of absolute declinations of stars were proposed: from observations on equator or from observations in both hemispheres by vertical circles and zenith-telescopes.

The compound programme is carried out at Pulkovo Observatory: for southern hemisphere the observations by the photographic vertical circle at Serro-Calan in Chile are used. In the northern hemisphere the observations by the zenith-telescopes on the island Spitzbergen, Pulkovo, Blagoveschensk, Kitab and the equator were proposed. The observations have already been completed: 30000 observations of stars were obtained. On the equator experimental observations were made only. The further work on equator remains undecided.

The coefficients of correlation between unknown corrections to 10° zones of star declinations and latitudes decrease by this method.