Publications of the Department of Astronomy — Beograd, № 6, 1976.

COMPARISON OF TWO PROGRAMS FOR THE DETERMINATION OF THE CORRECTIONS OF THE MICROMETER SCREW VALUE OF THE BELGRADE ZENITH TELESCOPE

M. Djokić
Astronomical Observatory, Belgrade

Summary: Two programs for the determination of the correction of the micrometer screw value of the Belgrade zenith telescope are compared. One is based on the Washington zenith star catalog the other is developed by the Shternberg Astronomical Institute in Moscow.

The results of three years'observation showed that the two applied programs were equally accurate. They also showed that the systematic difference between ΔR corrections under the two programs may be attributed to the different declination systems.

The scale pair method is used for the determination of the corrections of the micrometer screw value (ΔR) of the Belgrade zenith telescope. Observations are carried out on the basis of two programs:

1. The one developed from the Washington zenith star catalog (20 pairs) (Teleki, 1959); 2. the Moscow Shternberg Astronomical Institute program (Prodan, Gurštejn, 1966; Basurmanova-Gribko, 1966) specially designed for this purpose and intended to replace the 1935 Kimura program for the International Latitude Service (it contains 96 pairs fairly equally distributed by right ascensions).

Observations under Program 1 were started in 1958, under Program 2 in mid-1970. The material for comparison covers the 1970.0 — 1974.0. Observation conditions for the two programs were equal. The temperature effects on Talcott levels were controlled (since 1969) which decreased the single values of the amplitude of the inclination (β) variations from Talcott levels. While the mean value for the amplitude of the inclination variations under Program 1 was about one second of arc (0″.8) in 1965.1—1968.0 (Djokić 1972/73), this value after introduction of temperature control was cut down fourfold to 0″.15 in 1971.0—1974.0. In the same period this value under Program 2 was 0″.22. Thus, the accuracy of results for ΔR was increased under Program 1 (Table 1, ε_i = mean sqare error of the single values for ΔR correction for the given pair).

Table 1.

	Observation Period	ε_t	
Program 1	1965.1 — 1968.0	From ± 0".021	to ± 0".132
Program 1	1971.0 — 1974.0	From ± 0".012	to ± 0".038
Program 2	1971.0 — 1974.0	From ± 0".002	to ± 0".035

Table 2 presents: mean micrometer screw corrections ΔR, number of observations n, mean square errors for the mean micrometer screw corrections ε_m, and mean square errors for the single determination of the micrometer screw corrections ε_t.

Table 2.

	ΔR 1971.0 — 1974.0	n	ε_m	ε_t
Program 1	+ 0".0100	212	± 0".0017	± 0".0248
Program 2	— 0".0118	356	± 0".0014	± 0".0264

The results in Table 2 demonstrate that the two programs are about equally accurate. Program 2, however is advantageous in respect of observation (96 pairs and their fairly equally distribution by right ascension).

Systematic difference between ΔR corrections under the two programs (the relevant study being in progress) may be attributed to the different declination system.

REFERENCES

Basurmanova-Gripko L. P., 1966, Trudy Taškent. astr. Obs., *12*, 149.

Djokić M., 1972/73, Bull. Obs. astr. Beograd, *125*, 25.

Prodan J. I., Gurštejn A. A., 1966, Trudy Taškent. astr. Obs., *12*, 143.

Teleki G., 1959, Bull. Obs. astr. Beograd, *24*, 1—2, 29.