

Precessional Constant Determined from Optical Astrometry

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We have analyzed proper motions of about 30000 K-M giants chosen from the astrometric catalogue ACRS Part 1 (Corbin and Urban 1991). To avoid localized velocity fields, these K-M giants are chosen from the heliocentric distance interval 0.5 – 1.0 kpc. Starting from the initial trial of the luni-solar precessional correction $\Delta p \sim -0''.3/\text{cy}$, we have found that the motion of stars are well expressed in terms of the Oort constants for the K-M giants. After confirming that the K-M giants are in a steady-state, we have applied the velocity-field model of the plane-parallel galactic rotation with non-zero Oort constants. Then, we have found a rational set of the corrections to the FK5 system: $\Delta p = -0''.27 \pm 0''.03/\text{cy}$ and $\Delta e + \Delta \lambda = -0''.12 \pm 0''.03/\text{cy}$, as is shown in Table 1 (Miyamoto and Sôma 1993). In consequence, the FK5 system is still rotating.

TABLE I
Kinematic Parameters Derived from Proper Motions Given by ACRS Part 1

Kinematic Parameters	Least Squares Method	Maximum Likelihood Method	Least Squares Method
	K-M Giants $ z \leq 0.5$ kpc	K-M Giants $ z < 1.0$ kpc	Young Stars $0.5 \text{ kpc} \leq r \leq 3.0$ kpc
Δp ("/cy)	-0.267 ± 0.028	-0.214 ± 0.022	-0.27 (given)
$\Delta e + \Delta \lambda$ ("/cy)	-0.116 ± 0.026	-0.075 ± 0.037	-0.12 (given)
S_1 (km/s)	$+13.6 \pm 0.3$	$+13.4 \pm 0.31$	$+8.7 \pm 0.8$
S_2 (km/s)	$+23.3 \pm 0.3$	$+20.3 \pm 0.38$	$+15.9 \pm 0.8$
S_3 (km/s)	$+11.9 \pm 0.3$	$+12.2 \pm 0.22$	$+9.1 \pm 0.7$
S_{total} (km/s)	29.5	26.7	20.3
$A = D_{12}^+$ ("/cy)	$+0.263 \pm 0.012$	$+0.243 \pm 0.011$	$+0.285 \pm 0.019$
$B = D_{21}^-$ ("/cy)	-0.176 ± 0.010	-0.193 ± 0.010	-0.260 ± 0.015
V_θ (km/s)	-177.1 ± 6.2	-175.7 ± 6.0	-219.9 ± 9.8
D_{13}^+	0	0	-0.059 ± 0.011
D_{13}^-	0	0	$+0.059 \pm 0.011$
D_{23}^+	0	0	$+0.039 \pm 0.010$
D_{32}^-	0	0	$+0.039 \pm 0.010$
D_{zz} (km/s/kpc ²)	-	15.6 ± 2.2	-
σ_R (km/s)	-	$+31.3 \pm 0.4$	-
σ_θ (km/s)	-	$+25.2 \pm 0.5$	-
σ_z (km/s)	-	$+21.2 \pm 0.5$	-
$\epsilon_{\mu\alpha}$ ("/cy)	-	0.56 ± 0.02	-
$\epsilon_{\mu\delta}$ ("/cy)	-	0.52 ± 0.02	-
total number adopted	20292	22629	1892

References

- Corbin, T.E. and Urban, S.E. (1991) *Astrometric Catalogue Reference Stars (ACRS)*, U.S. Naval Observatory.
Miyamoto, M. and Sôma, M. (1993) *AJ*, 105, 691. L9.