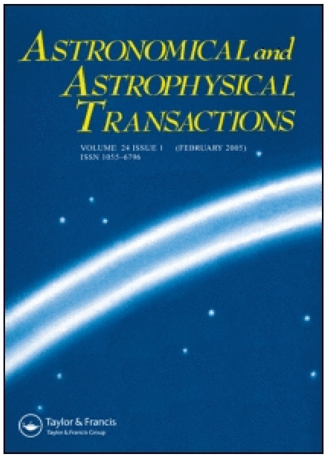

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V. A. Zakhozhaj [a]; E. V. Ruban [a]; A. M. Ejgenson [b]; O. S. Yatsyk [b]
[a] Astronomical observatory of Kharkov University, USSR
[b] Astronomical observatory of Lvov University, USSR

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CLUSTER ANALYSIS OF THE NEAREST STARS

V. A. ZAKHOZHAJ and E. V. RUBAN

Astronomical observatory of Kharkov University, USSR

A. M. EJGENSON and O. S. YATSYK

Astronomical observatory of Lvov University, USSR

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Cluster analysis is used to consider the space distribution of stars within 10 parsecs of the Sun. Space clustering of the 220 nearest stars in 22 clusters with radii within 1.5–5.1 ps is discovered. The physical entity of these clusters is discussed and their selected characteristics are presented.

KEY WORDS Nearest stars, statistics, clusters of stars.

Study of the space distribution of stars in the neighbourhood of the Sun is very important for understanding the cosmogonical history of the Galaxy, morphology and deficit of stars (Zakhozhaj, 1984) in this region. For this purpose cluster analysis of the 264 nearest multiple systems consisting of 359 stars was carried out. Sampling of these stars is extracted mainly from Zakhozhaj (1979, 1982) and the centroid method of cluster analysis for such problem is presented by Ejgenson and Yatsyk (1987, 1988).

The mutual space distance of multiple systems was accepted as a natural measure of similarity. Proper motions of the systems were taken as a physical entity criterion for stars in the clusters because in this case regular motions on the celestial sphere can be expected. Proper motion dispersion in the whole sample of the nearest multiple systems (σ^2) and outlined clusters (σ_i^2), according to the Fisher criterion ($F = \sigma^2/\sigma_i^2$) at a significance level $\alpha \leqslant 0.01$ (corresponding to the level of clustering $L = 4$–5 ps), allowed us to select stellar groups, which are perhaps of physical entity at present (Table 1).

Further we are going to estimate the ages of these clusters and investigate them in detail.

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Table 1 Cluster of nearest stars: *N*, number of cluster; *R*, radius of cluster in parsecs.

N	*R* (ps)	*Stars and systems*
I	4.26	Gl 831, Gl 842.1, Gl 846, Gl 849, Gl 867AB, Gl 879, Gl 881, Gl 884, Gl 915, Gl 1005, Gl 1276, Gl 1286, *L* 717–22, LHS 1070
II	2.90	Gl 829, Gl 841.1, Gl 844, Gl 896AB, Gl 1289
III	3.15	Gl 754.1AB, Gl 803, Gl 799AB, Gl 799.1
IV	3.03	Gl 581, Gl 588, Gl 595, Gl 620, Gl 628(AB), Gl 663AB, Gl 664
V	3.12	Gl 54, Gl 66AB, Gl 902, Gl 1264, Gl 1277
VI	3.36	Gl 231, Gl 257AB, Gl 341, Gl 367, Gl 1123, Gl 1128
VII	1.53	Gl 618.3, Gl 635AB, Gl 638, Gl 649, Gl 655
VIII	2.43	Gl 654, Gl 673, Gl 678.1AB, Gl 701, Gl 1207, Gl 1224
IX	3.64	Gl 686, Gl 721, Gl 747AB, Gl 768, Gl 791.2(AB)
X	3.90	Gl 695AB(CD), Gl 702AB, Gl 752AB, Gl 766AB, Gl 1230AB, Gl 1235, Gl 1256
XI	3.92	Gl 283AB, Gl 285, Gl 300, Gl 316.1, Gl 330, Gl 352AB, Gl 357, Gl 381, Gl 382, Gl 386, Gl 393, Gl 399, Gl 402AB, Gl 1103AB
XII	4.82	Gl 413.1, Gl 429.1, Gl 453, Gl 479, Gl 501.2, Gl 506, Gl 542
XIII	3.80	Gl 423AB(CD), Gl 434, Gl 436, Gl 438.1, Gl 450, Gl 480.2, Gl 507AB(C), Gl 508AB, Gl 519, Gl 521, Gl 1138, Gl 1151, LHS 2924
XIV	4.13	Gl 449, Gl 480, Gl 486, Gl 492, Gl 493.1, Gl 494, Gl 514, Gl 518, Gl 534(AB), Gl 566AB, Gl 579.1, 1154
XV	3.27	Gl 338AB, Gl 380, Gl 388, Gl 408, Gl 473AB, Gl 477.1 Gl 1111, Gl 1116AB, Gl 1156
XVI	2.66	Gl 34AB(C), Gl 49, Gl 51, Gl 75
XVII	3.26	Gl 623, Gl 625, Gl 661AB, Gl 694, Gl 713(AB), Gl 732.1, Gl 793, Gl 809, Gl 1227, Gl 1253
XVIII	4.86	Gl 212, Gl 226, Gl 251, Gl 268(AB), Gl 272, Gl 275.1 Gl 275.2AB, Gl 356AB, Gl 378, Gl 487, Gl 1105
XIX	5.06	Gl 27, Gl 33, Gl 68, Gl 70, Gl 102, Gl 109, Gl 117, Gl 137, Gl 157AB(C), Gl 1057, Gl 1065
XX	3.82	Gl 79, Gl 84, Gl 91, Gl 1028, Gl 1061
XXI	2.84	Gl 178, Gl 183, Gl 185AB, Gl 203, Gl 216AB(CD) Gl 229, Gl 1087
XXII	3.02	Gl 169, Gl 176, Gl 222, Gl 228AB, Gl 232, Gl 239, Gl 1093