RECENT DEVELOPMENTS IN THE WORK ON AUTOMATED SPECTRAL CLASSIFICATION BY MEANS OF OBJECTIVE PRISM SPECTRA

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Some years ago a complex programme of studying the main meridional section of the Galaxy was started by astronomers of Kiev, Tartu, Abastumani and Vilnius Observatories with the aim of improving our knowledge of spatial and kinematic characteristics of stellar populations. Characteristic to the programme is the use of absolute proper motions of stars together with automated quantitative spectral classification for large stellar-statistical samples. The data are gathered in areas lying within 30° of the main meridional section of the Galaxy. To classify stars, objective prism stellar spectra of intermediate dispersion (166 Å/mm at $H\gamma$), obtained with the 70 cm meniscus telescope at the Abastumani Astrophysical Observatory, are used. The field diameter is 4° 50′, and the limiting photographical stellar magnitude is about 12^m. Our system of automated quantitative spectral classification of F-K stars applies criteria evaluation and is mainly based on two software packages: the SDR package for spectrometric data reduction and the CTATEC-2 package determining the linear regression model used for classification (Malyuto & Shvelidze 1989; Malyuto, Pelt & Shvelidze 1993).

The main drawbacks of our spectral classification is a total shortage of stars in F0-G2 region, as well as of metal-deficient stars in the standard sample. Lack of photographic material prevents us from observing additional standard stars; however, many program stars in areas already covered might be used to calibrate the criteria (in line with the standards) if the reliable T_{eff}, M_v and [Fe/H] values for these stars were known from other sources. Fortunately, two fields photographed by us are located within 5° of the NGP and many investigations into the NGP region are available. The following sources have been used: a) DDO photometric classification of G-K stars in Hartkopf & Yoss (1982), together with corrected and additional DDO classification kindly sent to us by Dr. K. Yoss; b) photometric classification of F-stars by *uvby*β photometry from various sources (mainly Knude 1989; Hill, Barnes & Hilditch 1982; and the SIMBAD data); and c) Vilnius photometric classification of F-K stars kindly observed and processed for us by Dr. S. Bartasiute.

The total number of program and standard stars involved in calibration of our spectral classification criteria is about 260, of which 122 are standards. The programme stars are much fainter ($8^m < B < 12^m$) than the standards ($B < 7^m$) and they were photographed with widely varying exposures (less than 1 min and about 20 min for standard and program stars respectively). Suspicion arises that the values of the criteria may be randomly and/or systematically distorted as an effect of exposure length. To check this, we selected the stars of about the same luminosity

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and of normal metallicity and plotted the criteria values against $\log T_{eff}$. From a large number of plots we concluded that the effect mentioned above is rather small or absent. We suppose that the inclusion of standard and program stars into the sample of calibration stars will improve the classification results and extend the range of T_{eff}.

So far the spectra in four areas (for about 1000 stars in number, three plates per area) have been digitized. The spectra will be re-classified with a new regression model and applied to a study of the stellar populations. Another six regions of the programme have been observed with our objective prism on Kodak IIa-O and IIIa-J emulsion and are to be treated later.

References

Hartkopf, W. and Yoss, K.M., 1982. *Astron. J.*, **87**, 1679.
Hill, G., Barnes, J.V. and Hilditch, 1982. *Dominion Astroph. Obs. Publ.*, **16**, 111.
Knude, J., 1989. *Astron. Astrophys. Suppl.*, **81**, 215.
Malyuto, V. and Shvelidze, T., 1989. *Astrophys. Space Sci.*, **155**, 71.
Malyuto, V., Pelt, J. and Shvelidze, T., 1993. *Baltic Astronomy*, **1**, 526.