SEARCHING SIGNIFICANT SIGNATURES OF STELLAR POPULATION CHARACTERISTICS IN MULTIVARIATE STAR COUNT SAMPLES

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The limited observational performances which can be achieved on large collections of faint objects do not allow to derive intrisic stellar parameters such as distance, mass, age, space velocity, chemical composition of individual stars. However some information relevant to the distribution of these quantities is reflected in the n-dimensional distribution of observables : connecting observed distributions to the physical processes they come from is basically a multivariate problem for which some of us developped a synthetic approach of galaxy modelling (Robin, Crézé 1986, Bienaymé et al. 1987).

Most investigations of that kind, following Chiu (1980) use to project the data in a plot of reduced proper motions versus colour and eventually compare the observed distributions with the predictions of some stellar population model. In the present analysis, we try and use the multivariate analysis technics to search for meaningfull associations in the 5-dimensional space of observables between observed points and sets of simulated points generated from the above quoted galaxy model.

In practice, real stars are merged with model predicted ones in a single catalogue of 5-dimensional data (V, U-B, B-V, μ_l, μ_b) . Then a cluster analysis is performed providing a series of significant clusters. Different models can be used and the capability of models to represent the data is tested through the coincidence between real data and simulated ones in all clusters. Then the known intrisic properties of simulated stars can be used as tracers of the properties of associated real stars.

A preliminary investigation of the data obtained by Bienaymé et al 1991 in a field at intermediate galactic latitude, shows that a two component model of the Milky Way is not compatible with the data : an intermediate population between Halo and Disc is needed with clearly separate chemico-dynamical properties.

REFERENCES

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