THE UNDERLYING POPULATION IN YOUNG STELLAR SYSTEMS

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The problem of stellar population present in a young stellar system is studied from the point of view of the evolutionary synthesis. The dependence of the observable properties on: a) stellar mass loss, b) initial mass function, c) star formation rate, and d) age of stellar population is explored. Properties , such as colors and number of lyman continuum photons, that vary rapidly in time are derived and compared with existing data. The range from the UV to the IR is covered in our predictions. We find good agreement between the observations and our predictions for reasonable values of our free parameters.

We have used the spectral evolution model of Bruzual (1983), the stellar evolutionary tracks of Maeder (1981a,b,1983), Maeder and Mermilliod (1981) and Ciardullo and Demarque (1977) in the range mass 0.8 to 120 $M_\odot$. The high mass loss rate for masses between 120 and 60 $M_\odot$, case C for 30 $M_\odot$, case B for 15 and 9 $M_\odot$, for masses between 5 and 1.25 $M_\odot$ the no mass loss case and for masses in the range 1.19 to 0.8 the Ciardullo and Demarque tracks were used. To compute the integrated spectra of synthetic stellar population, Kurucz (1979) model atmospheres were used and for cool stars from F3V to M3II the IUE (1983) and Jacoby Hunter and Christian (1984) observed stellar spectra were used.

To understand the behaviour of our synthetic model, we present the results obtained for two SFRs: the first case is one burst lasting 1 Myr, and the second case is constant and continuous lasting 100 Myr. Stars are formed in the range from 0.5 to 120 $M_\odot$, distributed in mass according to four different IMFs: a) with a slope x = 1, b) Salpeter (1955), c) Miller and Scalo (1979), and d) with a slope x = 3, normalized to 1 $M_\odot$. Solar metallicity has been assumed throughout.

The predicted spectrum show clearly in the burst and in the continuous case the effect of the variation of the relative fraction of massive stars to small mass stars controlled by the SFR and the IMF. The spectral and color evolution in time of the stellar population allows an age estimation for observational data. The high mass loss rate is important only in the earlier stages of evolution.

The color evolution U-B, B-V with time is in good agreement with previous models by Searle *et al.* (1973) and Larson and Tinsley (1978).

Several LMC clusters and some open clusters have been analyzed with these models obtaining consistent age from different diagrams in the age range of 6.3×10^7yr to 4×10^8 yr for the LMC clusters and of 6.3×10^6 to 2.5×10^8 yr for the open clusters in agreement with previous determination in Tarrab (1982).

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