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Estimation of the stellar masses in 30000 galaxies with redshifts below 1.0

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Abstract Contemporary models of galaxy evolution predict the stellar masses of galaxies. Since it is hard to derive the galaxy type and hence the M/L from these models, it is nontrivial to predict the luminosities. From the observational point of view, extragalactic surveys like COMBO-17 provide the luminosity function (Wolf et al 2003). In order to link this observable to the stellar mass, a reliable estimation of the stellar M/L ratios of the galaxies is needed.

In order to assign survey objects to different M/L ratios derived from stellar population synthesis models Kauffmann et al (2003) proposed to use the 400 nm break together with the H_delta index. They applied it to 10^5 SDSS galaxies and derived the local distribution of stellar masses.

The COMBO-17 survey covers an area of one square degree and contains about 30’000 galaxies down to R=24 mag. Armed with this dataset we follow a different approach of stellar mass estimation. Using 5 broadband filters together with 12 medium band filters we use a 16 dimensional color space in order to classify the objects. For the galaxy class a new template library based on PEGASE spectra is developed. It is appropriate for multi color classification and delivers redshift estimations as well as estimations of the spectral energy distribution (SED) types. The SED type corresponds to a certain stellar M/L ratio delivered by the PEGASE code. This allows us to estimate the stellar masses for the galaxies in our sample in the redshift regime $0.1 < z < 1.0$. The lowest redshift bin can be compared to the Kauffmann et al result and shows a good agreement.