GAIA & STAR/GALAXY SEPARATION

STAR/GALAXY SEPARATION

READ at the end of a500_lecture13_s13.pdf and the SExtractor Book mud165.pdf (9.4) to understand the meaning of isophotal and "total" magnitudes

You can use several parameters, e.g FWHW; the ELLIPTICITY; the FLUXRAD (radius within is contained a fixed fraction of the flux e.g. 50% or 90%); SExtractor & co uses the CLASSTAR parameter based on neural network.

SExtractor (Bertin & Arnouts 1996) uses an Artificial Neural Network (ANN) to perform star-galaxy classification. In the default configuration, nine attributes (eight isophotal attributes and one attribute related to peak intensity) are used to classify the objects. One of the outputs is a parameter known as stellarity. Objects with a value for this parameter closer to 0 are more likely to be a galaxy and objects closer to 1 are more likely to be a star.

EXAMPLES

plckg_287.0+32.9_Rc_best_seeing_20130524_sw.cat is the catalog extracted by M. Nonino from its reduced image plckg_287.0+32.9_gmos_r_20150423_sw.fits (WFI@ESO paper of Bonafede et al. 2014 http://arxiv.org/abs/1402.1492).

plck287classstar.eps shows parameters vs R magnitude (classification has deifferent precision!); in G282classstar.eps is another example where FWHW is better settled. LETTEclassstar.png is an example of CLASSSTAR from the literature.

MAKE PLOTS WITH SUPERMONGO a figure of the type of plck287classstar.eps can be obtained from supermongo. Data are in plck287cat.classstar which is the catalog without the first lines. You can prepare a file similar to plck287classstar.inp and then:

sm

device postencap file.ps

input file.inp

end

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*Gaia point 13 Automatic Object Detection.

Look at the objs which are likely star or galaxies by eye...what about the respective values of class_star? Stars have class value high (0.8, 0.9), galaxies very low (~0). Look at ELL and FWHW.

CLASS/HOMEWORK Reconstruct a plot of PARAMETERS vs MAG (e.g. AUTO) for plckg_287.0+32.9_gmos_r_20150423_sw.fits. You can use SM or other software.