

Programma del corso Stellar Populations (AA 2012-2013) Bono, Pulone

Stellar models; basic assumptions
The H-R diagram
The virial theorem: derivation and physical meaning
Color-effective transformations
Bolometric corrections
From the H-R diagram to the observational planes
Metallicity scale
Luminosity Function and Mass Function estimate
Star formation, Isothermal Collaps, the Jeans Mass

Zero Age Main Sequence
Brief description of main stellar evolutionary phases of low mass stars
Lower and Upper Main Sequence stars
The mass - luminosity relation
The evolution along the RGB in low-mass stars
Zero Age Horizontal Branch
Dependence of the ZAHB location on stellar parameters
Off-ZAHB evolution
The AGB clump in low-mass stars

Galactic Stellar Populations
Classification by colors and luminosities
Evolutionary clock
Evolutionary tracks and isochrones
From the big bang Nucleosynthesis to stellar Pop I
Cosmological Y and D

The system of galactic Globular Clusters
Metallicity distribution of GGCs;
Schema of data reduction and interplay with evolutionary theories: completeness estimation
Astrophysical parameters indicator; source of errors
validation and calibration of isochrones
R parameter, $N(\text{AGB})/N(\text{HB})$. RGB bump
Effects of Breathing Pulses on counts
AGB as standard candle
Simple stellar Populations
Main Sequence Fitting; Isochrones vs Fiducial Lines
Age evaluation by Vertical methods
Absolute and relative ages of Globular Clusters
Age estimation of stellar systems by Artificial Neural Networks

Age-metallicity, and Age-galactocentric distance relationships
Age estimators in open clusters
Ages from Stromgren photometry; HB and second parameter, Metallicity and reddening estimators
An exemplum: Terzan 7
From simple to composite stellar populations
Dwarf Galaxies of the local group
Age indicator in Local Group CMDs
Methods for evaluating the chemical evolution of galaxies
The origin of the elements; the role of the stellar populations in the chemical enrichment of the Universe