EUCode User Guide

Layout of the overall code and functions of each folder/file contained within.

Documentation Template

❖**Folder Name/**
folder description

- *contained_filename.py*
  file description

❖**EUCode/**
contains the entire project

- *eucode.sh*
  the main shell file; in Terminal, type "bash eucode.sh" to run simulation

❖**Code/**
contains the various scripts called by *eucode.sh*

❖**eucode_recomb/**
The original Recombination Era script (Gay 2010)

❖**eucode_background/**
The Recombination Era script edited to model grid points within the halo which are never reached by ionization fronts (this is the same as the recombination code, but time shifted to a later date)

❖**eucode_dead/**
The Recombination Era script edited to model the stellar regions after they have died

❖**eucode_grid/**
The Recombination Era script edited to model the composition of a single grid point within the halo under the influence of any ionization fronts which reach that point

❖**eucode_star/**
The Recombination Era script edited to model the internal composition and radius of the ionization front around each individual star during its life

❖**plot/**

contains gnuplot scripts for plotting the overall output z-dependent abundance data into Postscript graphs

- *combined.plt*

  produces a single .ps file

- *separate.plt*

  produces numerous .ps files (for easy presentation of select data)

- *append.py*

  combines data from before and after star death into one datafile

- *grid.avg.py*

  averages the z-dependent abundances from each grid point to produce overall abundances within the modeled region

- *grid.py*

  defines the grid of points upon which /eucode_grid/lirec is run, calculates the distances between the grid points and the stars, and records if/when ionization fronts reach each point

- *model.data*

  contains parameters for defining the cosmic model used; most notably, use this file to edit changes to all eucode_* high resolution z-step values for consistency of data sets

- *stars.py*

  creates the modeled halo, distributes mass into various stars (according to the Salpeter IMF), and assigns stellar properties (position, radius, ionizing flux, etc.; Schaerer 2002)

- *visual.py*

  VPython visual model of the stars, Stromgren spheres, and grid points distributed throughout the halo

- *xstiff.dead.f*

  the primary script for “eucode_dead”; each run of the model requires this script to be edited for the number of stars produced and number of high resolution z-steps modeled, then copied to “eucode_dead” for recompiling

- *xstiff.grid.f*

  the primary script for "eucode_grid"; each run of the model requires this script to be edited for the number of stars produced and number of high resolution z-steps modeled, then copied to "eucode_grid" for recompiling

❖**Results/**

stores all data produced by the code (stars, ionization fronts, abundances, etc.)

❖**Grid/**

❖**point_*/**

contains data for grid point *

- *abund.avg*

  the calculated chemical abundance values for point *

- *point.data*

  distances from each star to the grid point; values of 0 represent a star who's ionization front does not reach the grid point

- *gridpos.txt*

  lists the spherical positions of all modeled grid points in (R, Θ, Φ)

❖**Stars/**

contains data for each of the stars produced

- *frontdata.txt*

  lists the radii of the Stromgren spheres for each star (in ascending mass)

- *stardata.txt*

  lists the properties of all stars assigned by stars.py (in ascending mass)

- *avg.pdf*

  the postscript file produced by combined.plt which presents the z-dependent abundances in *grid.avg.data*

- *grid.avg.data*

  the final data file containing the z-dependent abundances averaged over all grid points