The Scoop on PySEDfitOG

January, 2016

1   Introduction

PySEDfitOG is the heart and soul of the forthcoming PySEDfit without the fancy, currently dysfunctional new bits. It should (mostly) do everything that SEDfit classic did. Please break it and tell me how you do.

2   Making it Work

PySEDfitOG is found at `github.com/anazalea/PySEDfitOG`. But if you're reading this, you already knew that. After you've downloaded the repository's contents you might have to do a couple of things before you get SEDfitting.

For full functionality, PySEDfit requires NumPy, SciPy, Astropy, astroML, and scikit-learn. To make sure everything is in order, consider executing the following commands:

```
pip install --upgrade astropy
pip install --upgrade scikit-learn
pip install --upgrade astroML
```

If you want to use PySEDfitOG from the CL, you'll also need to append its location to your python path. Paste the following into your .bashrc (replacing /path/stuff/ with the location of your PySEDfitOG download):

```
PYTHONPATH=$PYTHONPATH:/path/stuff/PySEDfitOG/src/

export PYTHONPATH
```

3   makeBBsed

3.1   makeBBsed parameters

Parameter Name	Allowed Values	Description
rffmt	galaxev	Specifies the format of the input model file containing rest frame spectrum information. Someday it'll have options.
dotsed	xyz.sed	If galaxev input files are used, dotsed specifies the .sed filename
dotfourcolour	xyz.4color	If galaxev input files are used, fotfourcolour specifies the filename of the .4color file which contains parameter information about the models in the .sed file
filter_dir	/path/to/FTCs/	Specifies the path to the folder where filter transmission curve files are located
filter_names	sdss_u.ftc AA HSC_y.dat nm	Specifies the filenames of filter FTCs to be convolved with each processed spectrum. Each FTC file is assumed to have the format described somwhere (column 0 :wavelengths/frequencies, column1: transmission)
redshifts	range startValue stopValue stepValue values value1 value2 ... valueN	Specifies the redshifts to which each rest frame input spectrum will be shifted, if the range option is invoked, NumPy's arange function is used to create an array of redshifts, if the value option is used, an array is created from the specified values

Parameter Name	Allowed Values	Description
igm_law	madau inoue	Secifies the IGM attenation law to be applied to each redshifted spectrum. Madau (1998) and Inoue (2010) are currently supported
igm_opacities	range startValue stopValue stepValue values value1 value2 ... valueN	Specifies the IGM opacities of the specified attenuation law to be applied to each redshifted spectrum
dust_law	calzetti1997 calzetti2000 lmc smc mw dor30	Specified the dust reddening law to be applied to each spectrum.
ebvs	range startValue stopValue stepValue values value1 value2 ... valueN	Values of E(B-V)
output_file	outputFile.txt	Filename
cosmology	LCDM Ω_M Ω_Λ H_0 WMAP X	Specifies cosmology. PySEDit uses astroPy's cosmology class. If WMAP option is used, X must be 5, 7 or 9.
models	range startValue stopValue stepValue values value1 value2 ... valueN	Currently unsupported.

4   fitSED

4.1   fitSED Parameters

Parameter Name	Allowed Values	Description
data_file	data.txt	File containing data to be fit
data_flux_columns	0 2 4 6 8	Columns in data file containing flux/mag values
data_error_columns	1 3 5 7 9	Columns in data file containing flux/mag uncertainties
data_flux_unit	mag jansky	Specify whether data in data file is in mag or flux units
data_param	name column# format e.g. data_param ID 0 %i e.g. data_param z_{spec} 12 %f	Identifies columns in the data file that won't be used in fitting but should be included in the output. Multiple values of data_param are allowed.
model_file	models.txt	File containing models
model_flux_columns	1 2 3 4 5 6	Columns in model file containing flux/mag values
model_flux_unit	mag jansky	Specify whether data in model file is in mag or flux units
model_param	name colum# format scaleFlag e.g. z 1 %.2f False e.g. mass 2 %.3e True	Identifies columns in the model file that won't be used in fitting but should be included in the output. Multiple values of model_param are allowed. If scaleflag is true, the best fit value of the parameter will be scaled by the flux scaling factor found during fitting.
output_dir	/path/to/output/dir/	Path to folder where the output file should live. Defaults to cwd... I don't think I used this though. Specify full path in output_file if you don't want cwd.

Parameter Name	Allowed Values	Description
output_file	output.txt	Name of output file. Can include full path.
output_file	outputFile.txt	Filename
output_overwrite	true yes n	Control whether or not to overwrite an existing file of name output_file. Default to False.
mag_softening	0.3	Value to be added to data uncertainties.
fitting_method	brutefluxspace brutecolorspace brutedaisychain brutefiterrorbars	Fitting function to use. All currently supported methods are 'brute' in that they calculate χ^2 for every model and select the minimum. brutefluxspace scales all models to each line of data before fitting. brutecolorspace calculates $(n_{filters} - 1)$ colours for each model and data point before fitting. brutedaisychain calculates $n_{filters}$ colours. brutefiterrorbars TBD.
dchi2	0.15	threshold for use by brutefiterrorbars
mcits	1000	Number of monte carlo iterations to perform.
oldschoolmc	true false	If turned on, each line of data will be perturbed mcits times *before* fitting and each perturbed line of data will be fit individually. You'll end up with an output file of length mcits*len(data) and for later analysis
restrict_data		Not in Service. What is this supposed to do?
restrict_model		Out for lunch.
output_bestfit_spectra		Nope.
output_chisq_matrix		What does this do?

Parameter Name	Allowed Values	Description
data_mag_offsets		?
data_wavelengths		?