# The Scoop on PySEDfitOG

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## 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.

# 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 |
| igm_law | madau inoue | Secifies the IGM attenation law to be applied to each redshifted spectrum. Madau (1998) and Inoue (2010) are currently supported |

| Parameter Name | Allowed Values | Description |
|---|---|---|
| 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 $\Omega_M$ $\Omega_\Lambda$ $H_0$ 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<br><br>jansky | Specify whether data in data file is in mag or flux units |
| `data_param` | name column# format<br>e.g. data_param ID 0 %i<br>e.g. data_param $z_{spec}$ 12<br>%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<br><br>jansky | Specify whether data in model file is in mag or flux units |
| `model_param` | name colum# format<br>scaleFlag<br>e.g. z 1 %.2f False<br>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. |
| `output_file` | output.txt | Name of output file. Can include full path. |
| `output_file` | outputFile.txt | Filename |

| Parameter Name | Allowed Values | Description |
| --- | --- | --- |
| output_overwrite | true<br><br>yes<br><br>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<br>brutecolorspace<br>brutedaisychain<br>brutefiterrorbars | Fitting function to use. All currently supported methods are 'brute' in that they calculate $\chi^2$ 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<br>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? |
| data_mag_offsets | | ? |
| data_wavelengths | | ? |