Spotted Python

Week 9 Tutorial

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- Photometric redshift

Photometric Redshift

- Faster but less accurate than spectroscopic redshift
- Template fitting to a range of galaxy spectral energy distributions (SEDs)
  - Function of star formation history and the geometric arrangement of stars and gas content in galaxies
  - Energy versus wavelength
  - Fitting flux inputs of an object to a range of known spectra
  - Best fit is determined by a χ^2 minimisation process

$$\chi^2 = \min\left(\sum_i^N \frac{(O_i - E_i)^2}{E_i}\right)$$

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Running EAZY

- Easy and Accurate z_{phot} from Yale
- Installing eazy-py
  - **pip install eazy**
- Installing dust attenuation
  - **pip install git+https://github.com/karllark/dust_attenuation.git**

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Initial Mass Function

- Initial mass function (IMF) is defined as the number of stars that have formed per unit area of the galactic disk (pc^{-2}) per unit logarithmic (base 10) interval
- Miller-Scalo 1979

$$\xi(M) = 0.753M^{-1.4}$$

- Chabrier 2003

$$\xi(\log M) = \frac{3.63}{M\ln 10}\exp\left[-\frac{(\log M - \log 0.079)^2}{2(0.69)^2}\right]$$

- Both are normalised for $0.01 \leq M \leq 1M_{\odot}$

Integration

- scipy.integrate
  - https://docs.scipy.org/doc/scipy/tutorial/integrate.html
  - Provides several integration techniques
- np.trapz
  - https://numpy.org/doc/1.15/reference/generated/numpy.trapz.html
  - Integrates along the given axis using the composite trapezoidal rule
- Complete **Exercise 1**

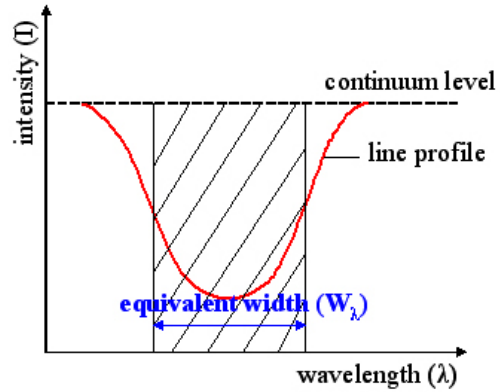
Equivalent Width

- Measure of the area of a spectra line
- Form a rectangle with a height equal to the continuum emission and finding the width such that the area of the rectangle is equal to the area in the spectral line. For absorption lines:

$$W_\lambda = \int \left(1 - \frac{F_\lambda}{F_c}\right) d\lambda$$

where F_λ is the flux of the spectra line and F_c is the flux of the continuum

- Complete **Exercise 2**



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Cosmological Calculator

- https://cosmocalc.icrar.org/
- astropy.cosmology
  - https://docs.astropy.org/en/stable/cosmology/index.html
- Test the consequences of changing the cosmological parameters