QSFit is a new software to automatically perform the analysis of Active Galactic Nuclei (AGN) optical/UV spectra. The software provides estimates of:

* AGN continuum luminosities and slopes at several rest frame wavelengths;
* host galaxy luminosities (for sources with z < 0.8);
* luminosities, widths and velocity offsets of 20 emission lines (Hα, Hβ, MgII, [OIII], CIV, etc.);
* luminosities of iron blended lines at optical and UV wavelengths;
* several "quality flags" to assess the reliability of the results.

QSFit fits all components simultaneously, using a smoothly broken power law to account for the broad band AGN continuum, which extends over the entire available spectrum.

QSFit aims to allow astronomers to run standardized recipes to analyze the AGN data, in a simple, replicable and shareable way.

QSFit is written in IDL and is released as free software (under the GPL license) on Github: https://github.com/gcalderone/qsfit

The QSFit model is built step by step, by iteratively adding a component and re-running the minimization procedure. The plots on the right show the comparison between the data and the model, as well as the individual components being added (left panels). The right panels show the residuals (data - model) in units of 1σ, the cumulative χ², and the distribution of the residual errors. The plots show the reliability of QSFit in estimating the broad band AGN continuum.

The plots above show the reliability of QSFit in estimating the broad band AGN continuum:

* the black lines show the composite spectrum of a subsample of sources within a very narrow redshift range (shown in the upper right corner). The composite spectrum is calculated as the geometrical average of SDSS de-reddened spectra;
* the red lines are the composite QSFit continuum, while the blue line is the composite of the sum of all QSFit components (except the emission lines). The average continuum slopes at 5100Å (left panels) and 3000Å (right panels) are shown with a dashed black line. The slope average and the standard deviation of the mean are shown in the lower left corner;
* the purple line is the commonly assumed slope (-1.5) for the AGN continuum.

The plots show that QSFit provides (at least on average) a good representation of the AGN continuum, even if the host galaxy contribute significantly to the overall luminosity. Also, they show (for the very first time on a very large sample) that the AGN continuum slopes at optical/UV wavelengths is constrained in the range -1.4 to -1.75 for all sources with z < 2.