EP 4130/PH 6130 Assignment 7

Deadline **27** March 2024 before **23:59** hrs Please show the source code.

- 1. Download the SPT f_{gas} data from http://iith.ac.in/~shantanud/fgas_spt.txt. Fit the data to $f_0(1+f_1z)$ where f_0 and f_1 are unknown constants. Determine the best fit values of f_0 and f_1 including 68% and 90% credible intervals using emcee and corner.py. The priors on f_0 and f_1 should be $0 < f_0 < 0.5$ and $-0.5 < f_1 < 0.5$. (30 pts)
- 2. Calculate the Bayes factor for the linear and quadratic model for the example given on fifth blog article of the Pythonic Perambulations Series using dynesty or Nestle. Do the values agree with what's on the blog (obtained by integrating the emcee samples).? (30 points)
- 3. Download the SDSS quasar dataset from http://astrostatistics.psu.edu/datasets/SDSS_quasar.dat. Plot the KDE estimate of the quasar redshift distribution (the column with the title z) using a Gaussian and also an exponential kernel (with bandwidth=0.2) from -0.5 to 5.5. (20 points)

(Hint: Look at the KDE help page in scikit-learn or use the corresponding functions in astroML module by looking at source code of astroML figures 6.3 and 6.4)