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 $f_0(1 + f_1 z)$ 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)