

PH 4130/PH 6130 Assignment 3

Deadline **8 February 2018** before **17:00 hrs**

All problems have equal weightage of 25 points each. Please show the source code used for each of the problems.

1. In class, we showed histograms of standard deviation and σ_G of bootstrap samples drawn from a Gaussian distribution with mean equal to 0 and standard deviation equal to 1. Draw a similar histogram of median of 10,000 bootstrap samples drawn from the same Gaussian distribution. According to <http://tinyurl.com/h6p43o8>, the standard deviation of the sample median of a Gaussian distribution is equal to $\sqrt{\frac{\pi}{2n}}$. Overlay a Gaussian distribution on top of the histogram with mean equal to the mean of the generated data sample and standard deviation equal to the standard deviation of the median (Hint: Look up `astroML.stats.median_sigmaG`)
2. arXiv:1008.4686, Exercise 1 on Page 5, except the last sentence of the question related to σ_m^2 . (Hint : Use χ^2 minimization to obtain best-fit values of b and m)