

# **Likelihood Functions and Markov Chain Monte Carlo continued**

# Running MCMC

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- Now you know how to code up your own MCMC, but usually it is more time effective to adopt a developed code
  - Some examples that are common in astronomy are:
    - emcee: the MCMC Hammer
    - PyMC3
  - There are also many examples for specific physical applications that employ MCMC.
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# Python tasks

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1. Using your code from Monday, create a plot of your  $m$  and  $b$  chains versus step number. Do the values of  $m$  and  $b$  appear to approach an equilibrium state?
  2. “Burn in” your code by running it long enough that your chains do appear to reach an equilibrium (i.e., your MCMC code has had time to transform your initial guess into something resembling the posterior distributions for  $m$  and  $b$ ). Use the end of your chain (not the first few) to determine the median values of  $m$  and  $b$ . Add these as straight lines in your plot.
  3. Plot distributions of your  $m$  and  $b$  chains, with the median and 68% intervals marked by straight lines.
  4. Do the “Fitting a model to data” emcee tutorial in the links.
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