

Problem Set - 4

Compact Binary Evolution, Rates and Population Modelling

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Problem 1:

Review of LVK Results: Download posterior samples of the Power Law + Peak Model from this link.

1. Plot the corner plot of the posterior samples.
2. Use the GWTC-3 paper to figure out the priors on these parameters and plot them too. Are the posteriors sufficiently different from the priors?
3. What are the relevant degeneracies that you can see? Explain all of them.
4. What statements about the underlying population of binaries can you make from these results?
5. Select one sample at random. From this, create a distribution of the source frame mass m_1 . Draw a population of binaries from this distribution.
6. Now repeat the above (still with one sample) to draw a population in mass ratio and redshift as well
7. Use all the posterior samples to draw a population in all parameters.