PHYS-512 PS4

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#1

Based on the chi-square value calculated in the test script, 15267.937150261654, those parameters are not an acceptable fit. The chi-square value resulted from the new parameters is 3272.2053559202204. This is not an acceptable fit either.

#2

The Levenburg-Marquardt algorithm was applied to find the best parameters. The initial parameters were [69,0.022,0.12,0.06,2.1e-9,0.95], which were given as a better guess in question 1.

The parameters are:

6.823463325770070753e+01

2.236258621308569866e-02

1.176838874120168799e-01

8.515373335540617206e-02

2.218177568678960319e-09

9.730110942363249249e-01

Their respective errors are:

1.188450738168605136e+00

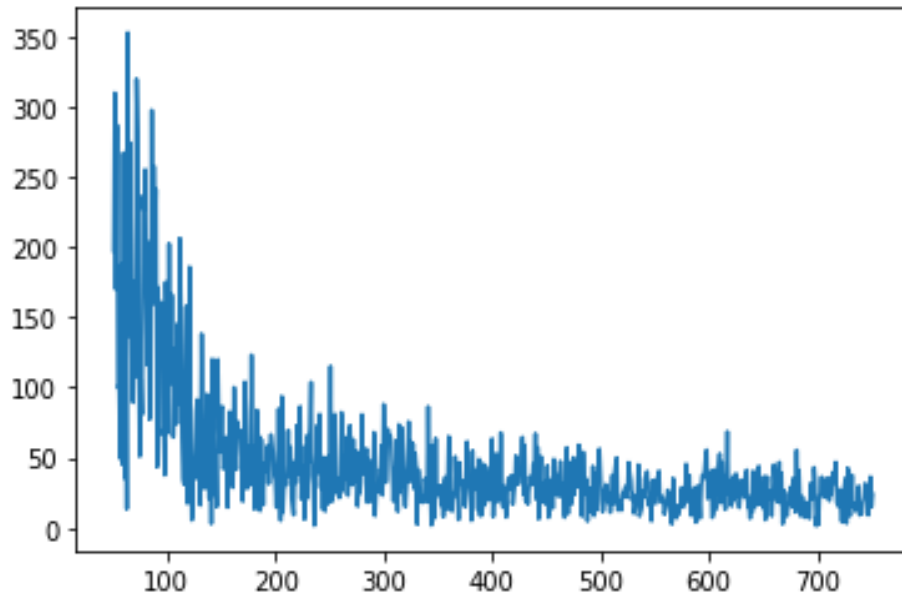2.292423197183533258e-04

2.658529621460607555e-03

3.420073911653787740e-02

1.433769709971731261e-10

6.577598309531005466e-03.

#3

Only 1500 steps have been completed in the simulation. It appears that the chain will converge, as a plateau can be seen in the following graph, which shows the Fourier-transformed value of the Hubble constant after each simulation step:

#4

Did not run MCMC for this question.