Bottom line:

* Slsqp (Sequential Linear Squares Programming) seems to be a winner.
* Fast (~5 sec per fit)
* Consistent (trying different param initial values)
  + But… consistent with final fit, but exact parameter values are different, perhaps expected, due to the parameter correlation.

Bad fits ("beta\_1": (0.2, 0, 2.0,0.001)):

* Dog-leg
* Basin-hopping
* Cobyla

beta\_1 = 0.2 vs 0.4, nelder

Chart, line chart

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Graphical user interface, chart, histogram

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Least\_squares: beta\_1 = 0.2 vs. 0.4

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Chart, line chart, histogram

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Emcee: beta\_1 = 0.2, 0.4

* Takes a long time

The chain is shorter than 50 times the integrated autocorrelation time for 6 parameter(s). Use this estimate with caution and run a longer chain!

N/50 = 20;

tau: [75.65711783 75.75031508 86.49113792 80.405437 91.0113276 78.05786324]

elapsed time = 781.4921419620514

[[Fit Statistics]]

# fitting method = emcee

# function evals = 100000

# data points = 498

# variables = 6

chi-square = 0.00995681

reduced chi-square = 2.0237e-05

Akaike info crit = -5376.40929

Bayesian info crit = -5351.14569

The chain is shorter than 50 times the integrated autocorrelation time for 6 parameter(s). Use this estimate with caution and run a longer chain!

N/50 = 20;

tau: [80.72286689 77.82871264 82.63024957 94.46531566 96.32584278 77.59481609]

elapsed time = 1026.5175378322601

[[Fit Statistics]]

# fitting method = emcee

# function evals = 100000

# data points = 498

# variables = 6

chi-square = 0.00173473

reduced chi-square = 3.5259e-06

Akaike info crit = -6246.61584

Bayesian info crit = -6221.35224

[[Variables]]

Chart, line chart

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Chart

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Slsqp (Sequential Linear Squares Programming)

* Fast
* Consistent

Chart, line chart, histogram

Description automatically generated Chart, line chart, histogram

Description automatically generated

![A close up of text on a white background

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elapsed time = 4.08487606048584

[[Fit Statistics]]

# fitting method = SLSQP

# function evals = 95

# data points = 498

# variables = 6

chi-square = 0.00151583

reduced chi-square = 3.0810e-06

Akaike info crit = -6313.79044

Bayesian info crit = -6288.52684

## Warning: uncertainties could not be estimated:

[[Variables]]

beta\_1: 0.32563456 +/- 0.00859312 (2.64%) (init = 0.4)

mu: 0.09714204 +/- 0.00107330 (1.10%) (init = 0.1)

c\_0: 0.12244695 +/- 0.00862149 (7.04%) (init = 0.1)

c\_1: 0.06702751 +/- nan (nan%) (init = 0.05)

c\_2: 2.18542609 +/- 0.06363033 (2.91%) (init = 2)

logI\_0: -6.44666463 +/- 0.04564022 (0.71%) (init = -6)

[[Correlations]] (unreported correlations are < 0.100)

C(c\_2, logI\_0) = -1.457

C(beta\_1, c\_0) = -1.308

C(c\_0, c\_2) = -1.229

C(beta\_1, c\_2) = 0.980

C(beta\_1, logI\_0) = -0.841

C(mu, logI\_0) = -0.534

C(c\_0, logI\_0) = -0.249

C(mu, c\_0) = -0.227

C(beta\_1, mu) = 0.199

Chart, histogram

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