Homework 3

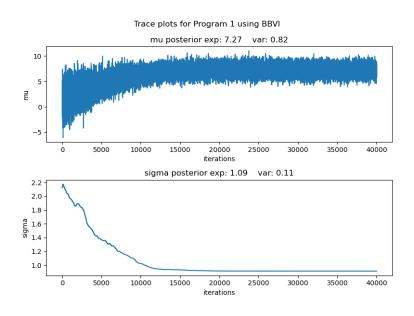
Kevin Yang - 50244152

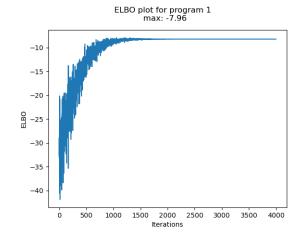
November 4, 2021

Link to repo:

https://github.com/keviny2/CPSC532W-Assignments/tree/main/FOPPL

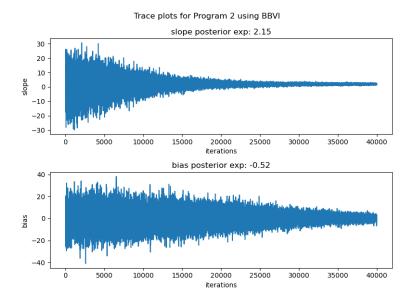
1 Program 1

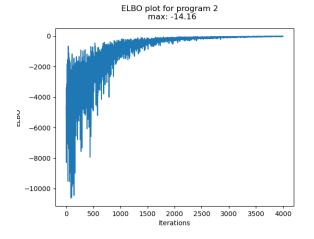




Took 96.73 seconds to finish Program 1 Posterior Expectation mu: tensor(7.2340) Posterior Variance mu: tensor(0.8279) Posterior Expectation sigma: tensor(1.0160) Posterior Variance sigma: tensor(0.0521)

2 Program 2



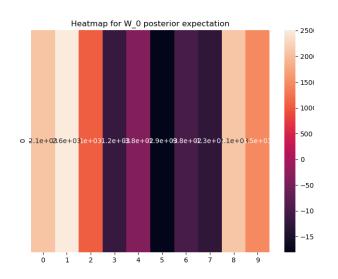


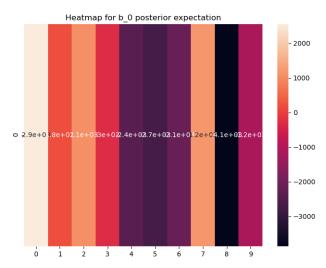
Took 289.66 seconds to finish Program 2
Posterior Expectation slope: tensor(2.1495)
posterior covariance of slope and bias:
[[0.05515892 -0.19639921]
[-0.19639921 0.86761098]]
Posterior Expectation bias: tensor(-0.5225)

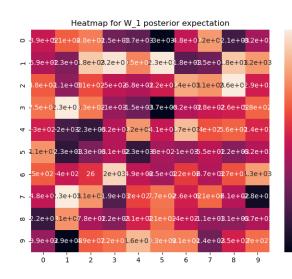
3 Program 3

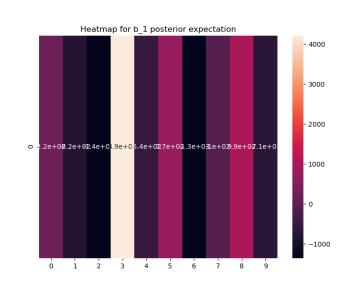
4 Program 4

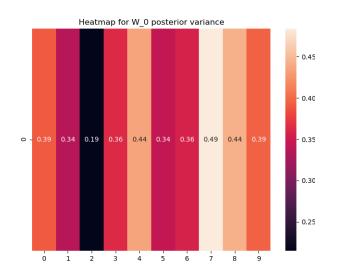
Black-box variational inference (BBVI) is more generic compared to parameter estimation via gradient descent. In BBVI, we compute an estimate of the gradient of the evidence lower bound (ELBO) using a sampling procedure instead of obtaining the gradient of the ELBO analytically. This renders BBVI applicable to a range of complicated models that parameter estimation via gradient descent will not be able to handle.

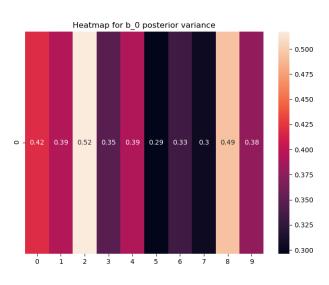










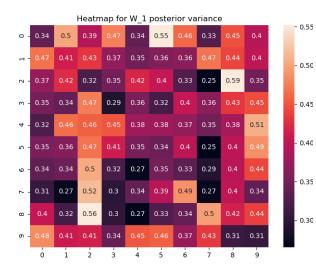


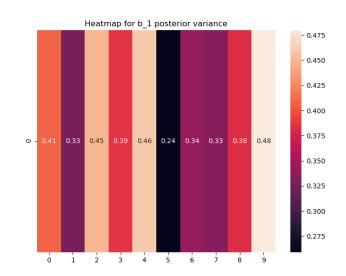
- 200

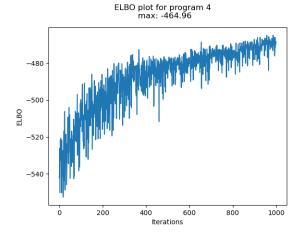
- 1000

- 0

-10







Took 2234.32 seconds to finish Program 4

5 Program 5