Chapter 8: Marcov Chain Monte Carlo (MCMC)

Make a note of the followings:

| Topic | Description | Comment |
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| Trace plot | use “tracerplot” instead of normal “plot” function when error is generated. | e.g., tracerplot(m8.1stan) |
| The effective number of samples | n\_eff is an estimate of the number of independent samples. In most typical regressions, as few as 200 effective samples will do for a good posterior distribution. |  |
| warmup | Warm is not ‘burn-in’ used in other method such as Gibbs sampling. In Stan, warmup is used to adapt sampling to obtain a posterior distribution. In other words, warmup is discarded. |  |
| How many chains? | 3 to 4 chains for checking correctly. |  |
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***“Four short chains to check, one long chain for inference”***

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| Step | Topic | Operation | Comment |
| 1 | Check Chains | Use 3 to 4 short chains | Check if the chain is working correctly, and see all of the chains end up in the same regions of parameter values |
| 2 | Determine Warmup | Determine warmup numbers through the first step |  |
| 3 | Decide iterations | Determine final warmup and iteration numbers | For example,   * warmup=1000, 9000 real samples: “warmup=1000”, “iter=10000” OR * “warmup=1000”, “iter=4000”, “chain=3” |
| 4 | Check “n\_eff” and “Rhat” | n\_eff << iter – warmup: chains are inefficient  n\_eff > iter – warmup: chains are efficient | * **Rhat shoul approach 1.00 in a healthy set of chains.** * **Even Rhat of 1.01 is suspicious** |

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