Diagnosing Convergence with Stan

STAT 341, Spring 2023

March 29, 2023

What if `n_eff` is too small?

- Try increasing the number of warmup iterations.
- Ensure your priors are appropriately informative and well-chosen
- Try reparameterizing (for example, standardizing where appropriate)
- If that doesn't work, you can consider actually *decreasing* `adapt_delta` to 0.8 or slightly below... but *not so low you start getting warnings about divergent transitions*.
- if `n_eff` / (post-warmup iterations) is *still* small but you have `n_eff` > 400, **it's likely okay**. (Some people say even fewer)

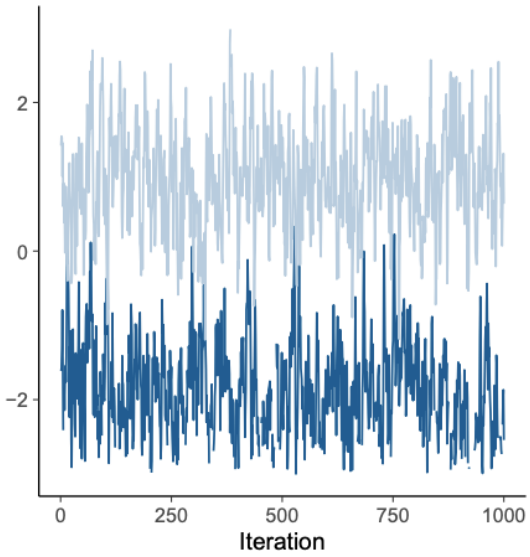
What if $\hat{R}$ is larger than 1?

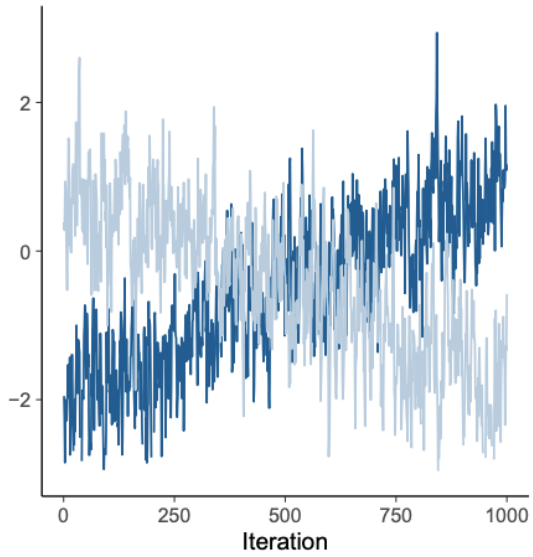
Even 1.01 or 1.02 is kind of "big"

- Try increasing the number of post-warmup iterations or the number of chains
- Ensure your priors are appropriately informative and well-chosen
- Try reparameterizing (for example, standardizing where appropriate)
- If none of the above helps and the trace plots look great, maybe it's still ok.

What if Trace Plot looks bad?

Here are 2 examples of ways it can be *bad* (each example has just 2 chains that are not mixing well):





What if Trace Plot (or trace rank plot) looks bad?

Similar options apply in either case

- Ensure your priors are appropriately informative and well-chosen
- Try reparameterizing (for example, standardizing where appropriate)
- Increase number of warmup iterations
- Increase `adapt_delta` from the default 0.8 to something closer to 1