Let

, where .

Use AR(1) for

**Constraints:**

Easy one: Just let and be diagonal. (Now is free, yay!)

Maybe just let diagonal is enough? Why?

A picture containing shape

Description automatically generated

Because the number of constraint parameters is , which is equivalent to the number of constraints in traditional constraint for **normal factor model**. **Try later.**

Using less constraints will lead to a faster convergence.

**Key derivation for clustering: Marginal distribution of .**

I no longer need to use auxiliary parameters.

Denote

Use the Laplace approximation:

, where is the Poisson density with mean and

This is fine, but finding the posterior mode by NR would be cumbersome if number of neuron is super large (and this force me to update by NR-(MH), but I prefer to do NUTS…).

**Better approximation? Think…**

**Simulation 1: known label**

Here I use , but since now I include , the effective . So, there’s one more factor than the real



Trace for X



**Simulation 2: same setting as in simulation 1, but remove the label.**

|  |  |
| --- | --- |
| Previous-auxiliary parameters method | NOW- even better |
| Chart, histogram  Description automatically generated |  |

**TODO**

The number of latent factor should be optimized. Choose by using the shrinkage prior and adaptive Gibbs sampler. See if I can easily do that.