## **Gibbs Sampler**

Assume we have parameter  $\theta_1, \theta_2, \theta_3$ , and we use gibbs sampling to get MC chains. In the blue book, I saw the algorithm as

 $egin{align} ullet & heta_1^{(n+1)} \sim P( heta_1 | heta_2^{(n)}, heta_3^{(n)}) \ ullet & heta_2^{(n+1)} \sim P( heta_2 | heta_1^{(n+1)}, heta_3^{(n)}) \ ullet & heta_3^{(n+1)} \sim P( heta_3 | heta_1^{(n+1)}, heta_2^{(n+1)}) \ \end{pmatrix}$ 

The send of third steps of above used updated  $\theta_1$  and  $\theta_2$  as condition in the sampling of the  $\theta_2$  and  $\theta_3$ .

But what if we use estimates from last loop only in the conditions, shown as below

 $egin{aligned} oldsymbol{eta}_1^{(n+1)} &\sim P( heta_1| heta_2^{(n)}, heta_3^{(n)}) \ oldsymbol{eta}_2^{(n+1)} &\sim P( heta_2| heta_1^{(n)}, heta_3^{(n)}) \ oldsymbol{eta}_3^{(n+1)} &\sim P( heta_3| heta_1^{(n)}, heta_2^{(n)}) \end{aligned}$ 

What will be the difference?

In my code for elliptical distribution, I see the sampling scheme of  $\alpha$ 's is using the second case instead of the first and it seems also working very well.