$$\lambda_i \mid y_i, \alpha, \mu \sim \text{Gamma}\left(\alpha + y_i,\ \frac{\alpha}{\mu} + e_i\right)$$

$$E[\lambda_i \mid y_i, \alpha, \mu] = \frac{\alpha + y_i}{\frac{\alpha}{\mu} + e_i}$$

λ_i: ith group m

$$= \frac{(\alpha + y_i)\mu}{\alpha + \mu e_i}$$

$$= \frac{\alpha\mu}{\alpha + \mu e_i} + \frac{\mu y_i}{\alpha + \mu e_i}$$

$$= \frac{\alpha}{\alpha + \mu e_i} \cdot \mu + \frac{\mu e_i}{\alpha + \mu e_i} \cdot \frac{y_i}{e_i}$$

μ: "global mean"; $\frac{y_i}{e_i}$: "ith obs"

$\frac{\alpha}{\alpha + \mu e_i} = B_i$; $\frac{\mu e_i}{\alpha + \mu e_i} = 1 - B_i$

B_i, $1 - B_i$: weights

Tutorial 9

Q1. $p(\theta, z \mid y) \propto \frac{1}{z!(y_1 - z)!} \left(\frac{1}{2}\right)^z \left(\frac{\theta}{4}\right)^{y_1 - z} \cdots$

$$\propto \frac{1}{z!(y_1 - z)!} 4^{y_1 - z + z} \left(\frac{1}{2}\right)^z \left(\frac{\theta}{4}\right)^{y_1 - z} \cdots$$

$4^{y_1 - z + z}$: (4^z); $\left(\frac{1}{2}\right)^z$: Δ

$$\propto \frac{1}{z!(y_1 - z)!} 2^z \cdot \theta^{y_1 - z} \cdots$$

$\Rightarrow \cdots$