$$\underbrace{\prod_{i=1}^{n} p(x_i \mid z_i, \lambda) \prod_{j=1}^{d} p(\lambda_j)}\; p(\pi) \prod_{i=1}^{n} p(z_i \mid \pi)$$

$$\lambda = (\lambda_1, \ldots, \lambda_d)$$

$$\lambda_j \mid \cdots \quad \propto \left\{ \prod_{[\;\;]} p(x_i \mid z_i, \lambda) \right\} p(\lambda_j)$$

$$\pi \mid \cdots \quad \propto \left\{ p(\pi) \prod_{i=1}^{n} p(z_i \mid \pi) \right\}$$

$$X = (x_1, \ldots, x_d)$$

$$(F_1(x_1), \ldots, F_d(x_d)) = (u_1, \ldots, u_d)$$

$$C(u_1, \ldots, u_d) = C(F(x_1), \ldots, F(x_d))$$

Sea $Y_i \sim \text{Poisson}(\lambda)$ $Y = (Y_1, \dots, Y_n)$

$\lambda \sim \text{Gamma}(\alpha, \beta)$

$$p(\lambda \mid y) \propto p(y \mid \lambda)\, p(\lambda)$$

$$= \prod_{i=1}^{n} p(y_i \mid \lambda)\, p(\lambda)$$

$$\propto \prod_{i=1}^{n} \left[\frac{\lambda^{y_i} e^{-\lambda}}{y_i!} \right] \frac{\beta^{\alpha}}{\Gamma(\alpha)} \lambda^{\alpha-1} e^{-\beta\lambda}$$

$$\propto \lambda^{\sum_{i=1}^{n} y_i} e^{-n\lambda} \lambda^{\alpha-1} e^{-\beta\lambda}$$

$$= \lambda^{\left(\sum_{i=1}^{n} y_i + \alpha\right) - 1} e^{-\lambda(n+\beta)}$$

$$= \lambda^{\alpha' - 1} e^{-\lambda\beta'}$$

$$p(\lambda \mid y) \propto \lambda^{\alpha' - 1} e^{-\lambda\beta'}$$

$$p(\lambda|y) = \frac{\prod_{i=1}^{n} p(y_i|\lambda)\, p(\lambda)}{p(y)}$$

$$= \frac{\prod_{i=1}^{n} \frac{1}{y_i!} \frac{\beta^{\alpha}}{\Gamma(\alpha)} \lambda^{\alpha'-1} e^{-\lambda\beta'}}{\int p(y|\lambda)\, p(\lambda)\, d\lambda}$$

$$= \frac{\prod_{i=1}^{n} \frac{1}{y_i!} \frac{\beta^{\alpha}}{\Gamma(\alpha)} \lambda^{\alpha'-1} e^{-\lambda\beta}}{\int \prod_{i=1}^{n} \frac{1}{y_i!} \frac{\beta^{\alpha}}{\Gamma(\alpha)} \lambda^{\alpha-1} e^{-\lambda\beta}\, d\lambda}$$

$$= \frac{\lambda^{\alpha'-1} e^{-\lambda\beta'}}{\int \lambda^{\alpha'-1} e^{-\lambda\beta'}\, d\lambda} = \frac{\frac{\beta'^{\alpha'}}{\Gamma(\alpha')} \lambda^{\alpha'-1} e^{-\lambda\beta'}}{\cancelto{1}{\int \left[\frac{\beta'^{\alpha'}}{\Gamma(\alpha')}\right] \lambda^{\alpha'-1} e^{-\lambda\beta'}\, d\lambda}}$$

$$= \frac{\beta'^{\alpha'}}{\Gamma(\alpha')} \lambda^{\alpha'-1} e^{-\lambda\beta'}$$

$(X_1, \dots, X_n) = (x_1, \dots, x_n)$. Sea $i \in \{1, \dots, n\}$

$$\ell(x) = \pi(x_1, \dots, x_{i-1}, x, x_{i+1}, \dots, x_n)$$

$$q(y \mid z) = f_i(y \mid x_{-i}) = \frac{f_i(x_1, \dots, x_{i-1}, y, x_{i+1}, \dots, x_n)}{f(x_{-i})} = \frac{f_i(x_1, \dots, x_{i-1}, y, x_{i+1}, \dots, x_n)}{\int f_i(x_1, \dots, x_{i-1}, z, x_{i+1}, \dots, x_n)\, dz}$$

$$\ell(x)\, q(x \mid y) = \ell(y)\, q(y \mid x)$$