Mean Field for Dependent PY

Factorized Gaussian Posteriors

$$q(\mathbf{u}) = \prod_{k=1}^{K} \prod_{i=1}^{N} \mathcal{N}(u_{ki} \mid \mu_{ki}, \lambda_{ki})$$

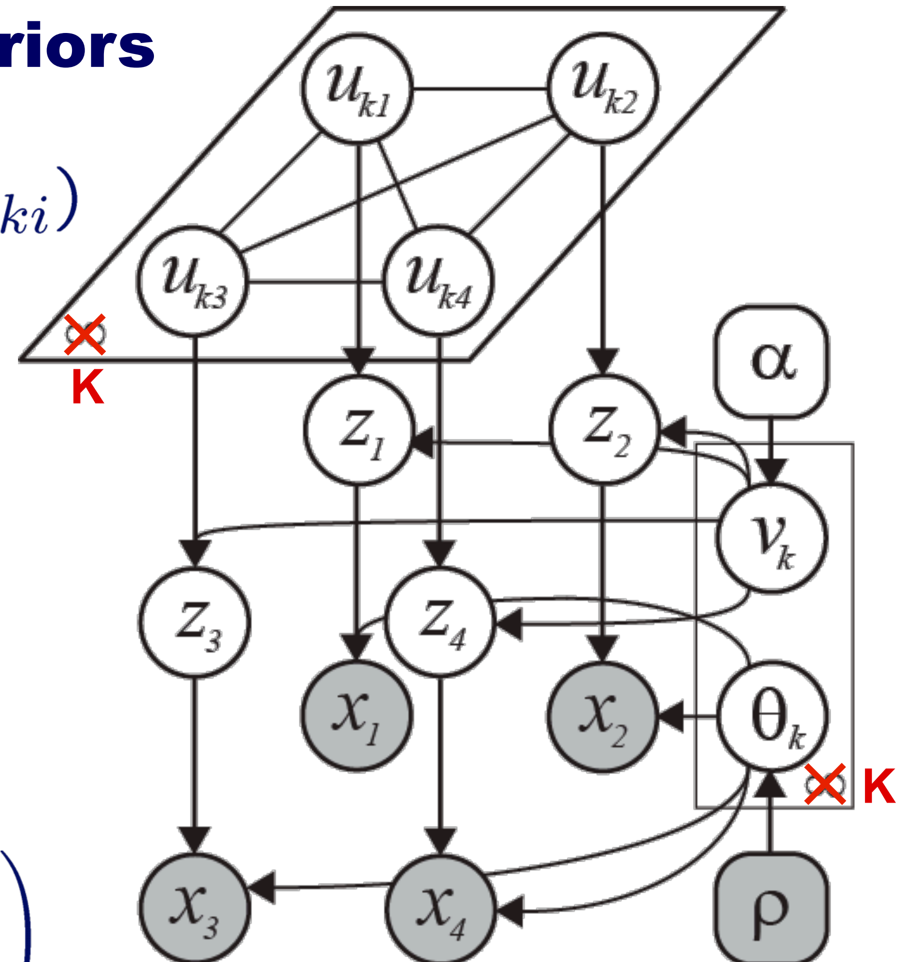
$$q(\bar{\mathbf{v}}) = \prod_{k=1}^{K} \mathcal{N}(\bar{v}_k \mid \nu_k, \delta_k)$$

Sufficient Statistics

$$z_i = \min\{k \mid u_{ik} < \bar{v}_k\}$$

Allows closed form update of $q(\theta_k)$ *via*

$$\mathbb{P}_q[u_{ki} < \bar{v}_k] = \Phi\left(\frac{\nu_k - \mu_{ki}}{\sqrt{\delta_k + \lambda_{ki}}}\right)$$



$$\log p(\mathbf{x} \mid \alpha, \rho) \geq H(q) + \mathbb{E}_q[\log p(\mathbf{u}, \bar{\mathbf{v}}, \boldsymbol{\theta} \mid \alpha, \rho)]$$