

Collapsed Gibbs for LDA

Model

$$p(\theta_d) = \text{Dir}(\beta)$$

$$p(\phi_t) = \text{Dir}(\alpha)$$

$$p(z_{dn} | \theta_d) = \Theta_{dz_{dn}}$$

$$p(w_{dn} | z_{dn}, \Phi) = \Phi_{z_{dn} w_{dn}}$$

$$p(Z | W) \sim \{ \textit{Gibbs Sampling} \}$$

$$\begin{aligned} p(\Phi | W) &= \int p(\Phi | W, Z) p(Z | W) dZ \\ &= \mathbb{E}_{p(Z | W)} p(\Phi | W, Z) \end{aligned}$$