

$\pi \sim \text{Dirichlet}(\alpha)$

for $j = 1$ to K do

$\mu_j \sim \text{Dirichlet}(\beta)$

endfor

for $i = 1$ to n do

$\text{product}_i \sim \log \mu_j \times x_i$

$\text{Allprob}_i \sim \log \pi + \sum \text{product}_i$

$\text{Allprob}_i \sim [\text{Allprob}_i - \max(\text{Allprob}_i)]$

$\text{probs}_i \sim \text{Allprob}_i / \sum \text{Allprob}_i$

$C_i \sim \text{Multinomial}(1, \text{probs}_i)$

for $j = 1$ to K do

$\text{count}_j \sim \sum C_{ij}$

$\alpha_i \sim \alpha_i + \text{count}_i$

$\pi_i \sim \text{Dirichlet}(\alpha)$

for $j = 1$ to K do

$\text{count}_j \sim \sum C_{ij}$

$\log \mu_j \sim \log(\text{Dirichlet}(\beta + \text{count}_j))$

endfor