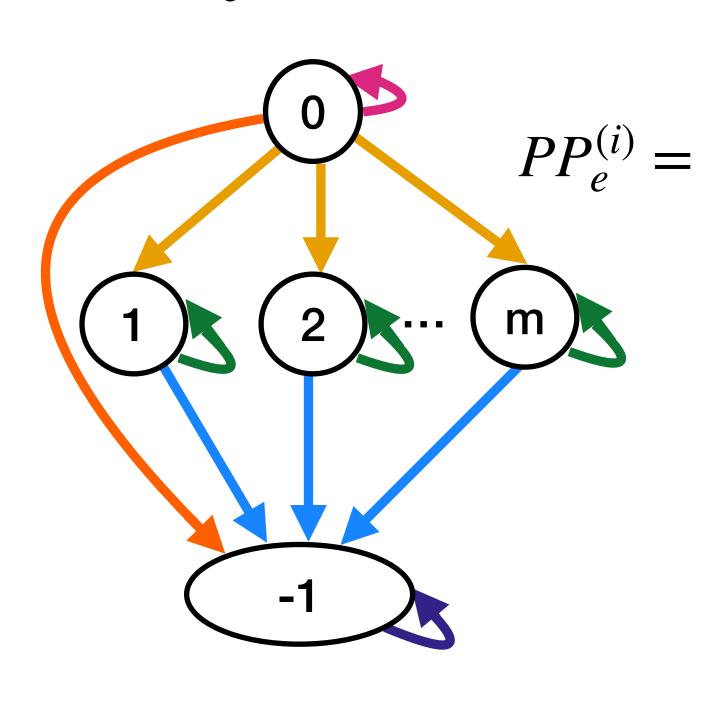
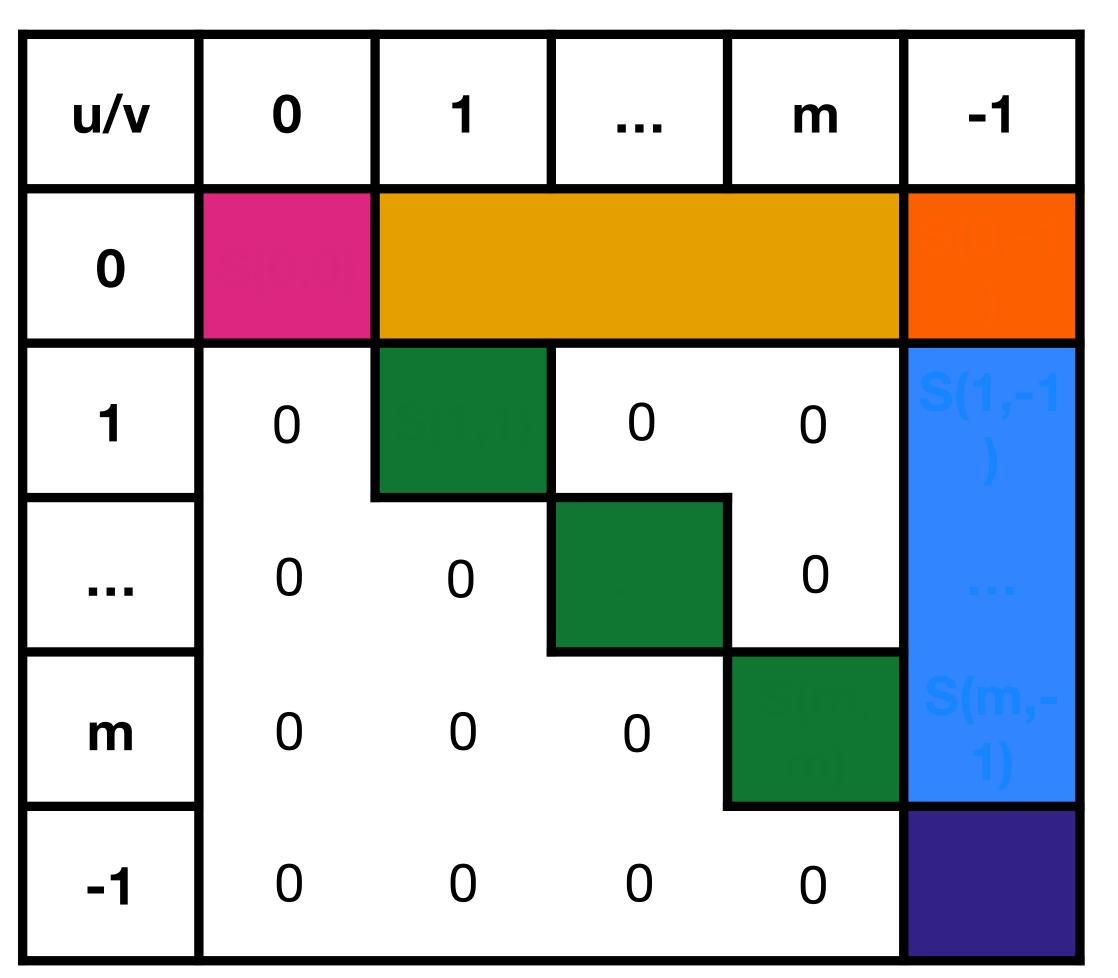
Posterior probabilities:

$$PP_e^{(i)}(\alpha,\beta) = \mathbb{P}(\chi^{(i)}(u) = \alpha,\chi^{(i)}(v) = \beta \mid \mathcal{D}^{(i)}; T,\Theta)$$



$$S_{0,0}(e,i) = PP_e^{(i)}(0,0)$$

$$S_{0,\alpha}(e,i) = \sum_{\alpha \in \Sigma'} PP_e^{(i)}(0,\alpha)$$



 $\forall e \in E(T)$ compute:

$$S_{0,0}(e,i)$$
 $S_{0,\alpha}(e,i)$ $S_{0,\alpha}(e,i)$ $S_{\alpha,\alpha}(e,i)$ $S_{0,-1}(e,i)$ $S_{-1,-1}(e,i)$ $S_{\alpha,-1}(e,i)$

M-step

$$\max_{\Theta} \sum_{e \in E(T)} f \begin{cases} S_{0,0}(e, i) \\ S_{\alpha,\alpha}(e, i) \\ S_{0,\alpha}(e, i) \\ S_{0,-1}(e, i) \\ S_{\alpha,-1}(e, i) \end{cases}$$

$$S_{\alpha,\alpha}(e,i) = \sum_{\alpha \in \Sigma'} PP_e^{(i)}(\alpha, \alpha)$$

$$S_{\alpha,\alpha}(e,i) = \sum_{\alpha \in \Sigma'} PP_e^{(i)}(\alpha,\alpha) \quad S_{\alpha,-1}(e,i) = \sum_{\alpha \in \Sigma'} PP_e^{(i)}(\alpha,-1)$$

$$S_{-1,-1}(e,i) = PP_e^{(i)}(-1,-1)$$

$$S_{0,-1}(e,i) = PP_e^{(i)}(0,-1)$$