Update for f11

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$$S(U,V) = \prod_{ij} N(u_i^T v_j | m_{i,j}^{c,-11}, v_{i,j}^{c,-11}) \prod_i \prod_k N(u_{i,k} | m_{i,k}^{u,-11}, v_{i,k}^{u,-11} \prod_j \prod_k N(v_{j,k} | m_{j,k}^{v,-11}, v_{j,k}^{v,-11}) \tag{1}$$

$$Q_{U,V} = \prod_i \prod_k N(u_{i,k} | m_{i,k}^{u}, v_{i,k}^{u}) \prod_j \prod_k N(v_{j,k} | m_{j,k}^{v}, v_{j,k}^{v}) \tag{2}$$

We need to minimize the $KL(Q_{UV} \| S)$

$$\begin{aligned} KL(Q_{U,V} \| S) &= E_{Q_{U,V}} \ln \frac{Q_{U,V}}{S(U,V)} \\ &= E_{Q_{U,V}} \ln Q_{U,V} - E_{Q_{U,V}} \ln S(U,V) \\ &= E_U \ln Q_U + E_V \ln Q_V - E_{U,V} \ln S(U,V) \end{aligned} \tag{3}$$