M-step details

$$\mathcal{L}(\theta, q) = \sum_i \sum_c q(t_i = c) \log \frac{p(x_i, t_i = c \mid \theta)}{q(t_i = c)}$$

$$= \sum_i \sum_c q(t_i = c) \log p(x_i, t_i = c \mid \theta)$$

$$- \sum_i \sum_c q(t_i = c) \log q(t_i = c)$$

$$= \mathbb{E}_q \log p(X, T \mid \theta) + \text{const}$$

(Usually) concave function w.r.t. θ, easy to optimize