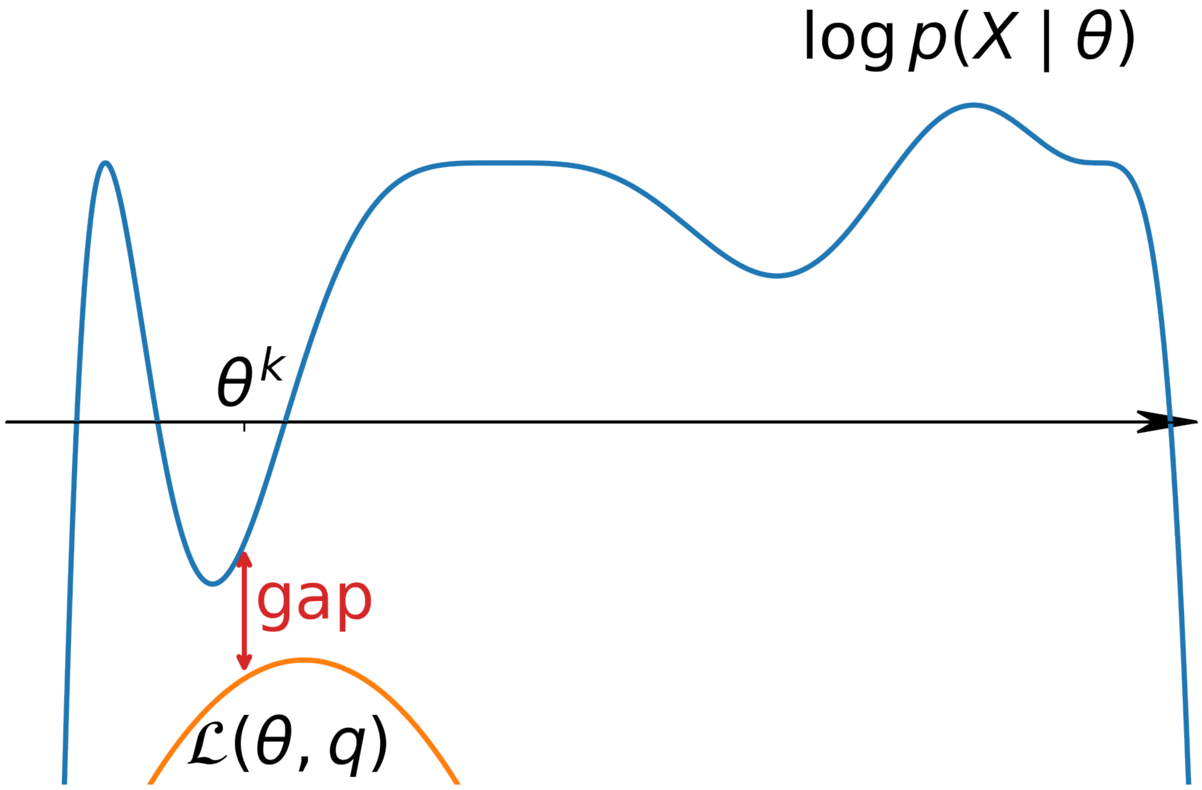
E-step details

$$\log p(X \mid \theta) \geq \mathcal{L}(\theta, q)$$

E-step: $\max\limits_{q} \mathcal{L}(\theta^k, q)$



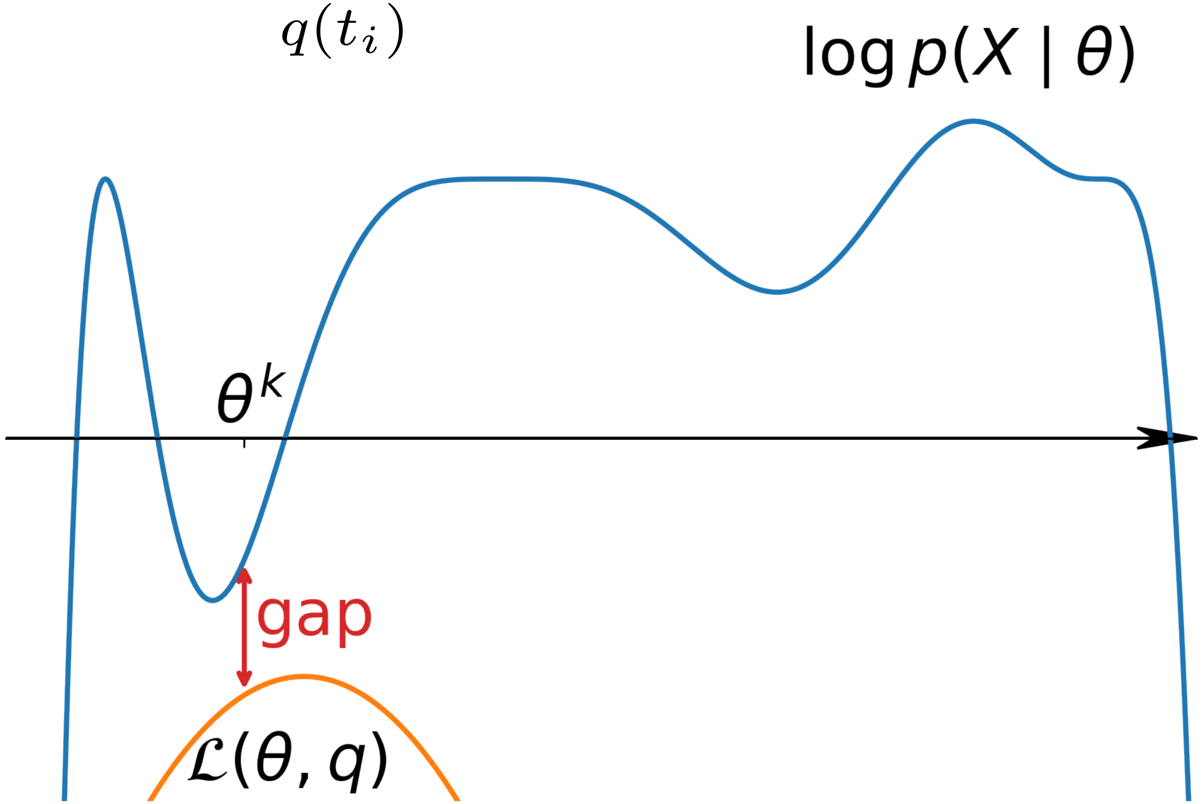
E-step summary

We want to minimise the GAP between log likelihood and the lower bound. Once its 0, then we got a good fit!

$$\log p(X \mid \theta) - \mathcal{L}(\theta, q) = \sum_i \mathcal{KL}\left(q(t_i) \parallel p(t_i \mid x_i, \theta)\right)$$

^ This turns out to be equal to the KL divergence! Proof in typora

E-step: $\arg\max_{q(t_i)} \mathcal{L}(\theta^k, q) = p(t_i \mid x_i, \theta)$



E-step summary

$$\log p(X \mid \theta) - \mathcal{L}(\theta, q) = \sum_i \mathcal{KL}\left(q(t_i) \parallel p(t_i \mid x_i, \theta)\right)$$

E-step: $\underset{q(t_i)}{\arg\max}\, \mathcal{L}(\theta^k, q) = p(t_i \mid x_i, \theta)$