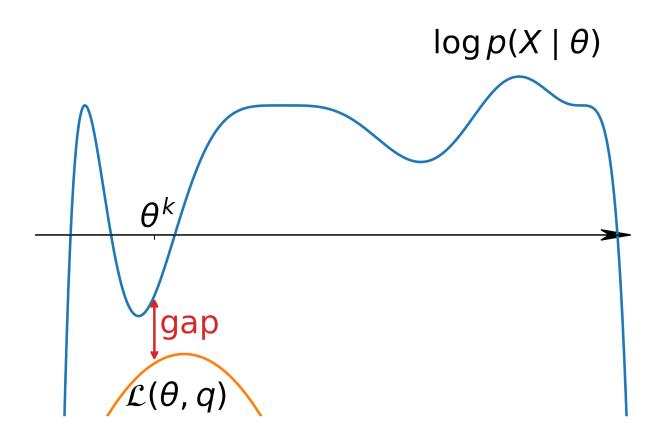
$$\log p(X \mid \theta) \ge \mathcal{L}(\theta, q)$$

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

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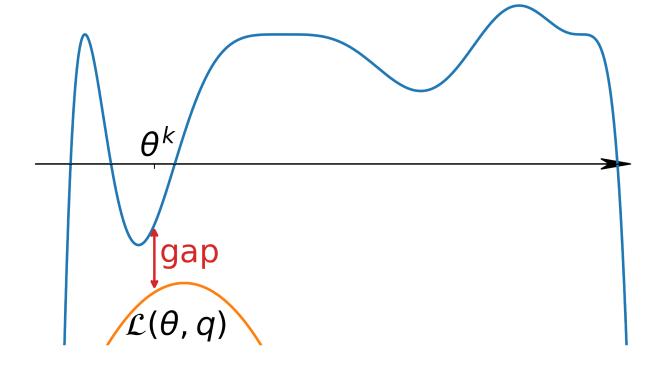


#### **E-step summary**

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

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

$$\log p(X \mid \theta)$$



#### **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: 
$$\underset{q(t_i)}{\operatorname{arg\,max}} \mathcal{L}(\theta^k, q) = p(t_i \mid x_i, \theta)$$
  
 $\underset{q(t_i)}{\operatorname{log}} p(\mathbf{X} \mid \theta)$ 

