

Objective: $\operatorname{argmax}_{\theta} \lg \prod_j \sum_{k=1}^K P(Y_j=k, x_j | \theta) = \sum_j \lg \sum_{k=1}^K P(Y_j=k, x_j | \theta)$

Data: $\{x_j \mid j=1 \dots n\}$

Notation a bit inconsistent
Parameters = $\theta = \lambda$

- **E-step:** Compute expectations to “fill in” missing y values according to current parameters, θ
 - For all examples j and values k for Y_j , compute: $P(Y_j=k \mid x_j, \theta)$
- **M-step:** Re-estimate the parameters with “weighted” MLE estimates
 - Set $\theta = \operatorname{argmax}_{\theta} \sum_j \sum_k P(Y_j=k \mid x_j, \theta) \log P(Y_j=k, x_j \mid \theta)$