

number!!!

EM - algorithm

$$E \Rightarrow p(z_i=j | x_i, \theta) =$$

$$\frac{p(z_i=j) \cdot f(x_i | \theta, z_i=j)}{\sum_{k=1}^K p(z_i=k) \cdot f(x_i | \theta, z_i=k)} = g_{ij}(\theta_{old}) \rightarrow p(z_i=j)$$

$$M \Rightarrow LB(p(z); p(z, x | \theta)) = \sum_i \sum_j p(z_i=j) \ln \frac{p(z_i=j, x_i | \theta)}{p(z_i=j)} \rightarrow \max_{\theta}$$

g_{ij} Old punk.
 θ_{new} \rightarrow не зависит от θ

$$Q(\theta; \theta_{old}) = \sum_i \sum_j g_{ij}(\theta_{old}) \cdot \ln p(z_i=j, x_i | \theta) \rightarrow \max_{\theta}$$

N_1, N_2

$$LB \approx Q = \sum_i g_i \ln [p(x_i | z=1, \theta) \cdot p(z_i=1)] +$$

$$\sum_{i=1} (1-g_i) \cdot \ln [p(x_i | z=2, \theta) \cdot p(z_i=2)] \rightarrow \max_{\theta}$$

$$\hat{\mu}_1, \hat{\mu}_2, \hat{\sigma}_1^2, \hat{\sigma}_2^2, p(z_i=1)$$

E -

$$\sum g_i \cdot x_i$$

$$\sum g_i = 1$$

