1　9.43

9.40　　　E　　　．
$$E = \sum_{n,k} \gamma(z_{nk})(\log \pi_k + \log \mathcal{N}(x_n|\mu_k, \Sigma_k)).$$

ϵE

$$\mathcal{N}(x|\mu_k, \Sigma_k) = \frac{1}{(2\pi\epsilon)^{D/2}} \exp(-\frac{1}{2\epsilon}||x - \mu_k||^2)$$

．

$$\epsilon E = \sum_{n,k} \gamma(z_{nk})(\epsilon \log \pi_k - \frac{D}{2}\epsilon \log(2\pi\epsilon) - \frac{1}{2}||x_n - \mu_k||^2).$$

$\epsilon \to 0$

$$\gamma(z_{nk}) \to r_{nk}.$$

$$\epsilon \log \pi_k \to 0.$$

$$\epsilon \log(2\pi\epsilon) \to 0$$

$$\epsilon E \to -\frac{1}{2}\sum_{n,k} r_{nk}||x_n - \mu_k||^2 = J.$$

J　　　　　　　．