$$Ncut(V) = tr(O \cdot P)$$
$$= tr(O' \cdot P)$$

$$\hat{Y} = \arg\min_{Y} tr\left(Y^T(D-W)Y \cdot (Y^T D Y)^{-1}\right)$$

$L = D - W$ (Laplacian Matrix).

(三十二) VAE

Variational Auto-encoder.

Latent Variable Model

$Z \rightarrow X$

GMM: K个Gaussian Dist混合: $Z \sim$ Categorical Dist

VAE: infinite Gaussian Dist混合: $Z \sim N(0, I)$ (解空间高斯分布, 单位矩阵)

$X|Z \sim N(\mu_\theta(Z), \Sigma_\theta(Z))$

$$P(X) = \int_Z P(X, Z)\, dZ = \int_Z P(Z) \cdot P(X|Z)\, dZ$$

↓ intractable

$$P(Z|X) = \frac{P(Z) \cdot P(X|Z)}{P(X)}$$

↓ intractable

$P_\theta(X|Z)$

$P(Z) = N(0, I)$

$P_\theta(X|Z) = N(\mu_\theta(Z), \Sigma_\theta(Z))$

$P_\theta(Z|X)$ is intractable.

$q_\phi(Z|X)$

EM: $\log P(X) = ELBO + KL(q_\phi(Z|X) \,||\, P_\theta(Z|X))$

E-step: 当 $q = P_\theta(Z|X)$ $KL = 0$, $E = ELBO$

M-step: $\theta = \arg\max ELBO$