

# Natural Language Processing

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## 1 KL divergence of Gaussians

1 Dimension:

$$D_{\text{KL}}(P\|Q) = \frac{1}{2} \left[ \log \frac{\sigma_2^2}{\sigma_1^2} + \frac{\sigma_1^2}{\sigma_2^2} + \frac{(\mu_1 - \mu_2)^2}{\sigma_2^2} - 1 \right]$$

D Dmension:

恐らく  $\mu$  は縦ベクトル。

$$D_{\text{KL}}(P\|Q) = \frac{1}{2} \left[ \log \frac{|\Sigma_2|}{|\Sigma_1|} + \text{tr} \{ \Sigma_2^{-1} \Sigma_1 \} + (\vec{\mu}_1 - \vec{\mu}_2)^T \Sigma_2^{-1} (\vec{\mu}_1 - \vec{\mu}_2) - d \right]$$

Reference