

Kullback-Leibler divergence:

$$D_{\text{KL}}[p : q] = \int p \log \frac{p}{q} d\mu$$

$\alpha = 1$

$\alpha = -1$

Amari's  $\alpha$ -divergence ( $\alpha \in \mathbb{R}$ ):

$$D_{\alpha}^A[p : q] = \begin{cases} \frac{4}{1-\alpha^2} \left( 1 - \rho_{\frac{1-\alpha}{2}}[p, q] \right), & \alpha \notin \{-1, 1\} \\ D_{\text{KL}}[p : q], & \alpha = -1 \\ D_{\text{KL}}[q : p], & \alpha = 1. \end{cases}$$

Tsallis divergence:

$$D_{\alpha}^T[p : q] = \frac{\rho_{\alpha}[p : q] - 1}{\alpha - 1}$$

Rényi divergence:

$$D_{\alpha}^R[p : q] = \frac{\log \rho_{\alpha}[p : q]}{\alpha - 1}$$

$\frac{u-1}{\alpha-1}$

$\frac{\log u}{\alpha-1}$

$$D_{\alpha}^A[p : q]$$

**Bhattacharyya coefficient:**

$$\rho_{\alpha}[p : q] = E_q \left[ \left( \frac{p}{q} \right)^{\alpha} \right] = \int p^{\alpha} q^{1-\alpha} d\mu$$

$(\alpha \in (0, 1), 0 < \rho_{\alpha}[p : q] \leq 1)$

$-\log u$

$-\log \min u$

Bhattacharyya distance:

$$D_{\alpha}^B[p : q] = -\log \rho_{\alpha}[p : q]$$

Chernoff information:

$$D^C[p : q] = -\log \min_{\alpha \in (0, 1)} \rho_{\alpha}[p : q]$$

Neyman  $\chi^2$ -divergence:

$$D^N[p : q] = \frac{1}{2} \int \frac{(q-p)^2}{q} d\mu$$

$\alpha = -3$

$\alpha = 3$

$\alpha = 0$

Pearson  $\chi^2$ -divergence:

$$D^P[p : q] = \frac{1}{2} \int \frac{(q-p)^2}{p} d\mu$$

Hellinger divergence:

$$D^H[p : q] = 1 - \rho_{\frac{1}{2}}[p : q]$$