Approximating the KL-Divergence

$$D_{KL}(p\|q) = \mathbb{E}_{x\sim p(x)}\left[\log\left(\frac{p(x)}{q(x)}\right)\right]$$

↳ hard to evaluate (analytically)

↳ sometimes it is even impossible

Remedy: Law of large numbers

$$D_{KL}(p\|q) \approx \frac{1}{L}\sum_{l=0}^{L-1}\log\left(\frac{p(X=x^{[e]})}{q(X=x^{[e]})}\right) \quad \text{with } x^{[e]}\sim p(x)$$