

Variational Inference



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Variational inference (ТЕХНИЧЕСКИЙ СЛАЙД)

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VARIATIONAL FAMILY



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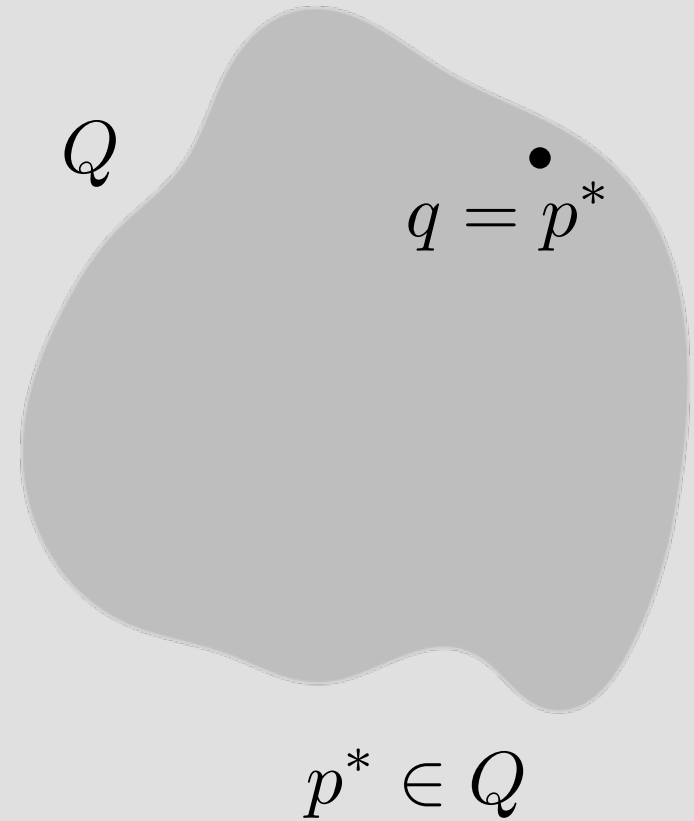
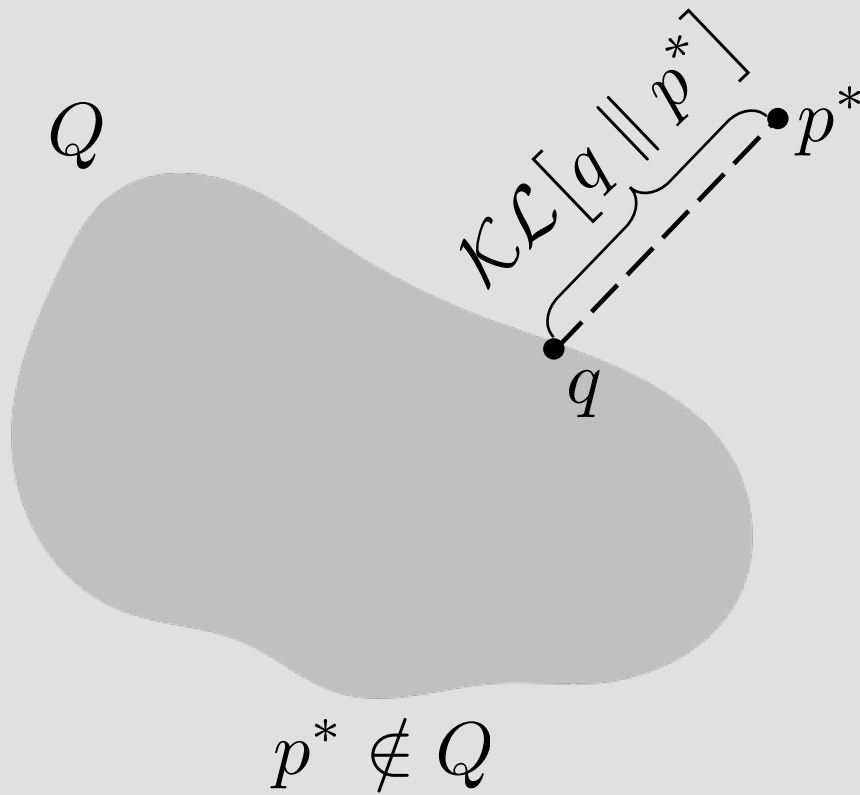
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2. Find best approximation $q(z)$ of $p^*(z)$:

$$\mathcal{KL}[q(z) \parallel p^*(z)] \rightarrow \min_{q \in Q}$$

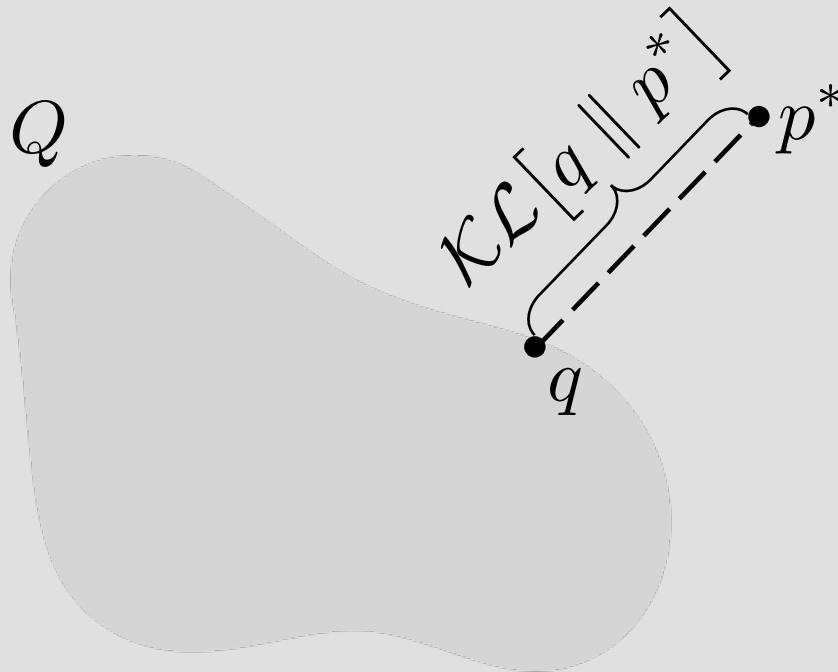


Choice of variational family

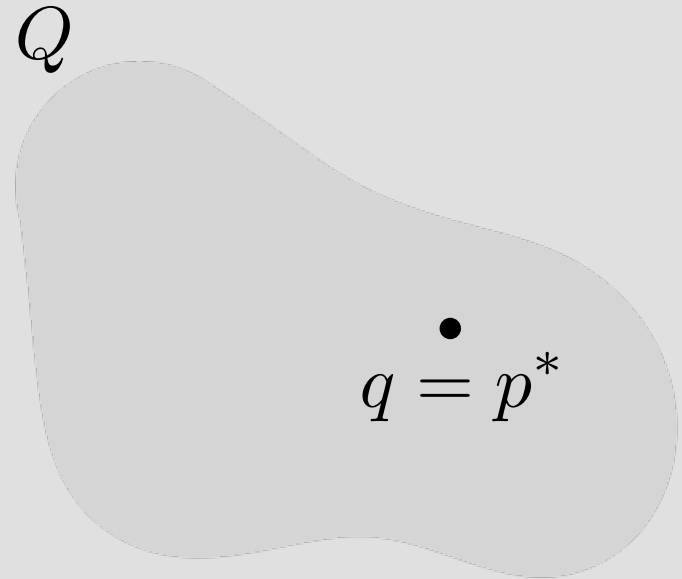


Choice of variational family (ТЕХНИЧЕСКИЙ СЛАЙД)

В стиле если Q не накрое p^* , то будет расстояние какое-то.
А если накрое, то q и p^* совпадут + немного темнее фигуру



$$p^* \notin Q$$



$$p^* \in Q$$

LARGER $Q \Rightarrow$ HARDER



Unnormalized distribution

$$p^*(z) = p(z|X) = \frac{p(X|z)p(z)}{p(X)} = \frac{\hat{p}(z)}{Z}$$



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$$\mathcal{KL}[q(z) \parallel \frac{\hat{p}(z)}{Z}] = \int q(z) \log \frac{q(z)}{\hat{p}(z)/Z} dz$$



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$$\begin{aligned}\mathcal{KL}[q(z) \parallel \frac{\hat{p}(z)}{Z}] &= \int q(z) \log \frac{q(z)}{\hat{p}(z)/Z} dz \\ &= \int q(z) \log \frac{q(z)}{\hat{p}(z)} dz + \int q(z) \log Z dz\end{aligned}$$



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