

题1: 概率分布的梯度.

$$\nabla_u \min E_q[(\epsilon + u)^2]$$

$$I_1 = 2(\epsilon + u) \quad \leftarrow \quad \cancel{\frac{1}{S} \sum_{s=1}^S \nabla_{\theta} \ell(\theta, z_s)}$$

$$I_2 = (\epsilon + u)^2 \cdot \nabla_u \log \frac{1}{\sqrt{2\pi}} e^{(-\frac{x^2}{2})} = (\epsilon + u)^2 \cdot 0$$

$$\nabla_{\theta} L(\theta) = I_1 + I_2 = 2(\epsilon + u)$$