Exercise - 5: Variational Auto-Encoders

December 2, 2025

Questions

Q1. What are the two main components of the VAE loss function (ELBO), and what is the role of each?

Q2. Explain the purpose of the reparameterization trick in training a VAE.

Q3. Write the expression for the ELBO $\mathcal{L}(\theta, \phi; x)$ in terms of the approximate posterior $q_\phi(z|x)$, prior $p_\theta(z)$, and likelihood $p_\theta(x|z)$.

Hint

Instructions

- Show all necessary steps clearly.