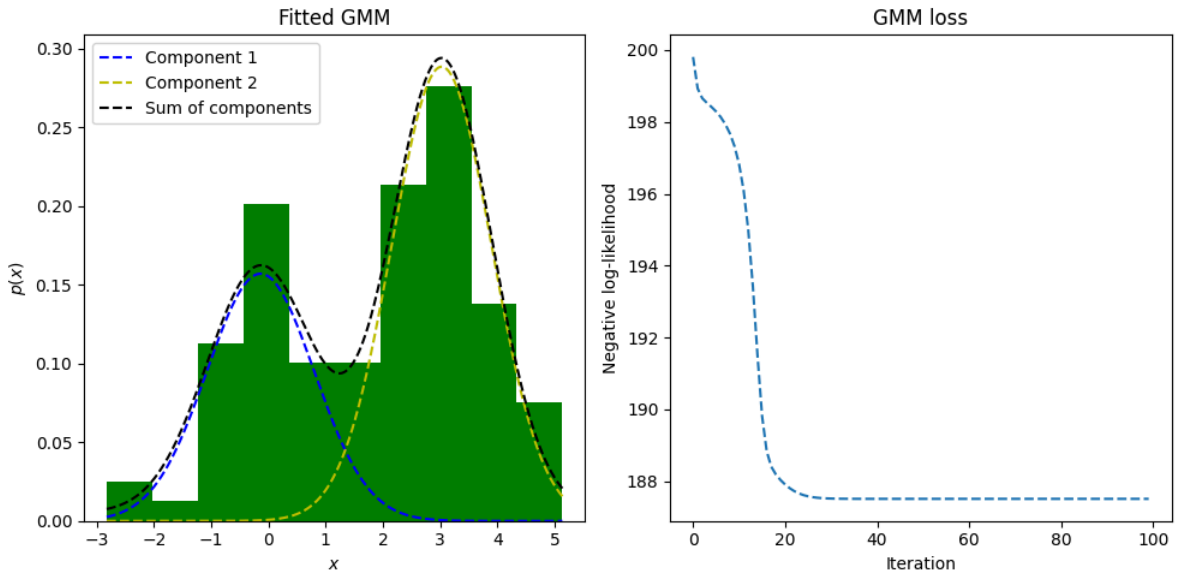
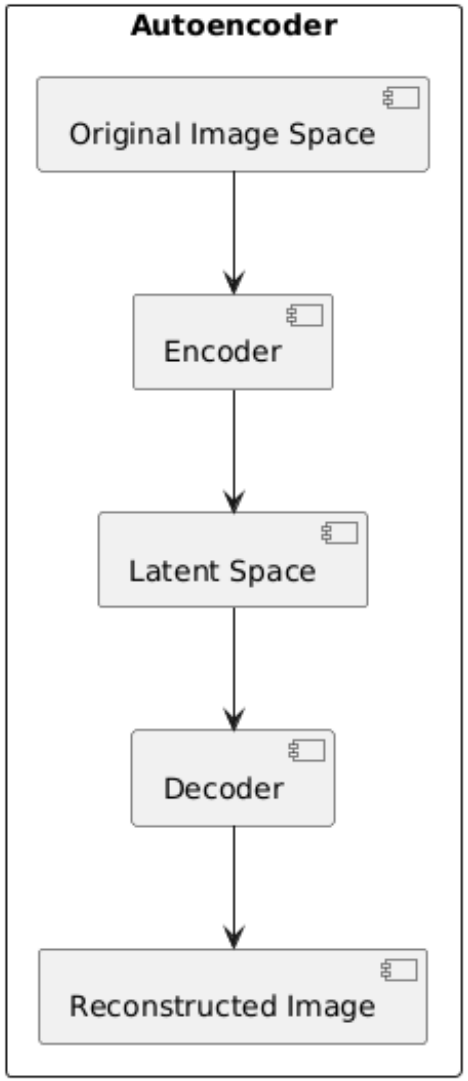
# Visualizing GMM Distribution Learning



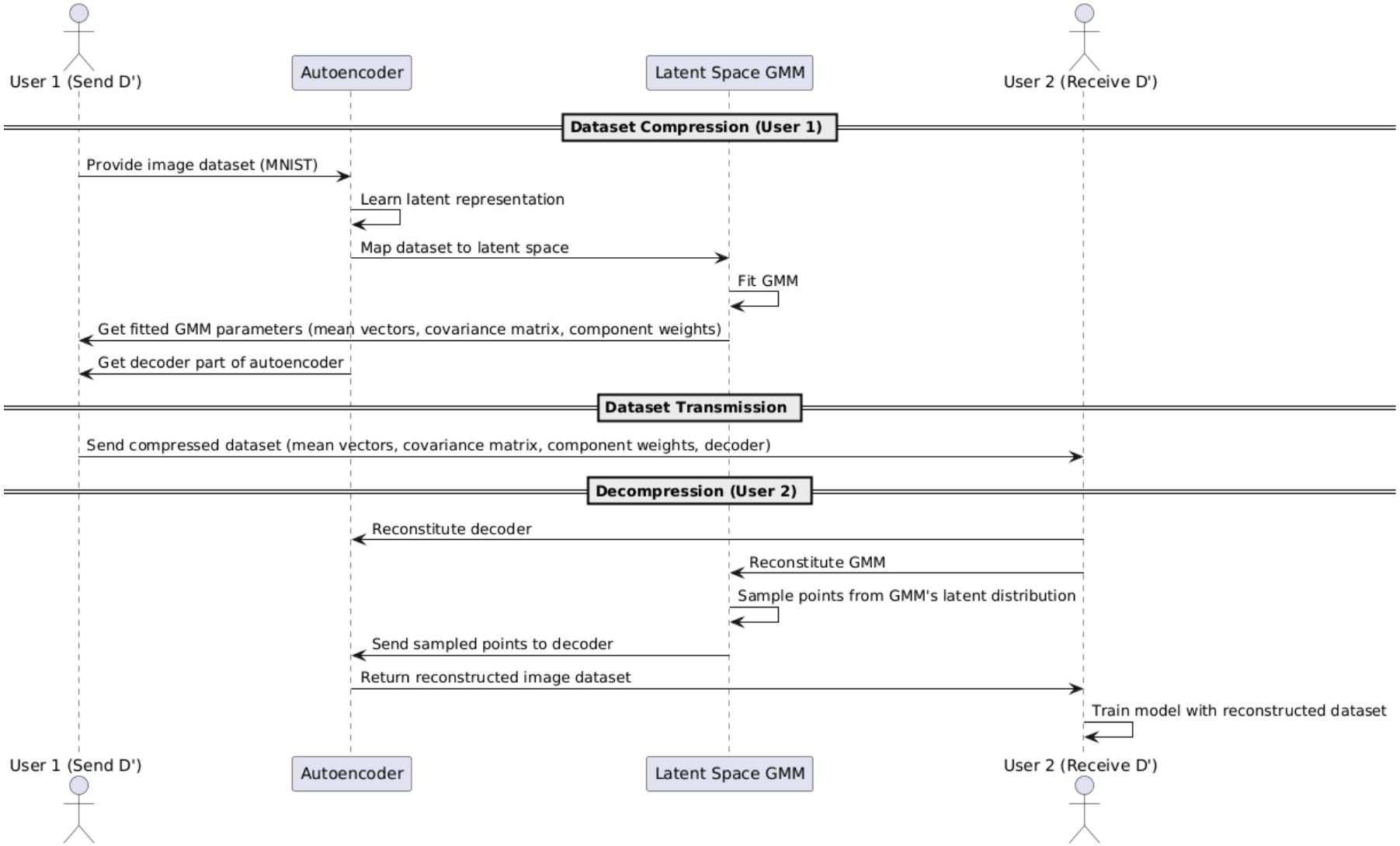

- The image shows the learning of a Gaussian Mixture Model (GMMs) with two components ($k = 2$).
- The distribution is a linear combination of the two components:

$$p(z) = \pi_1 \mathcal{N}(\mu_1, \Sigma_1) + \pi_2 \mathcal{N}(\mu_2, \Sigma_2)$$

# Compression with Autoencoders and GMMs



# Compression Step



# VAE Loss Function

The VAE loss combines two terms:

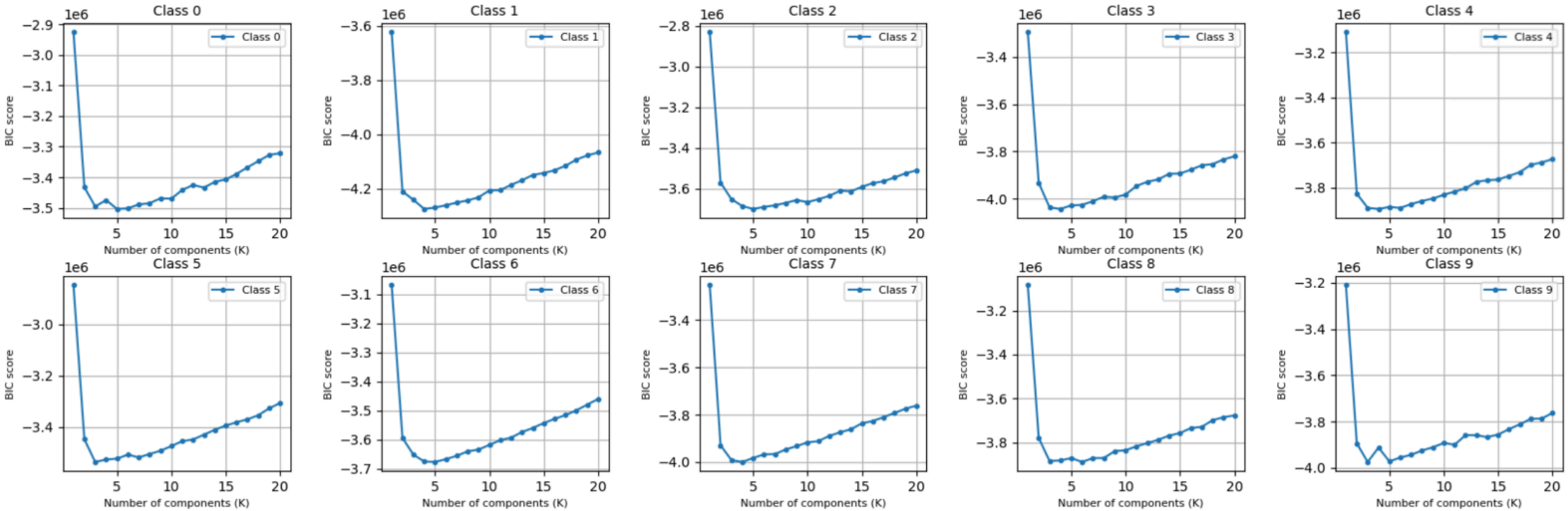
1. **Reconstruction Loss**:

$$L_{\text{recon}}(x, \hat{x}) = ||x - \hat{x}||^2$$

2. **KL Divergence** (regularizer):

$$L_{\text{KL}} = D_{\text{KL}}(q(z|x)||p(z))$$

# BIC Curve




$$\mathrm{BIC} = k\ln(n) - 2\ln(\widehat{L})$$