/62

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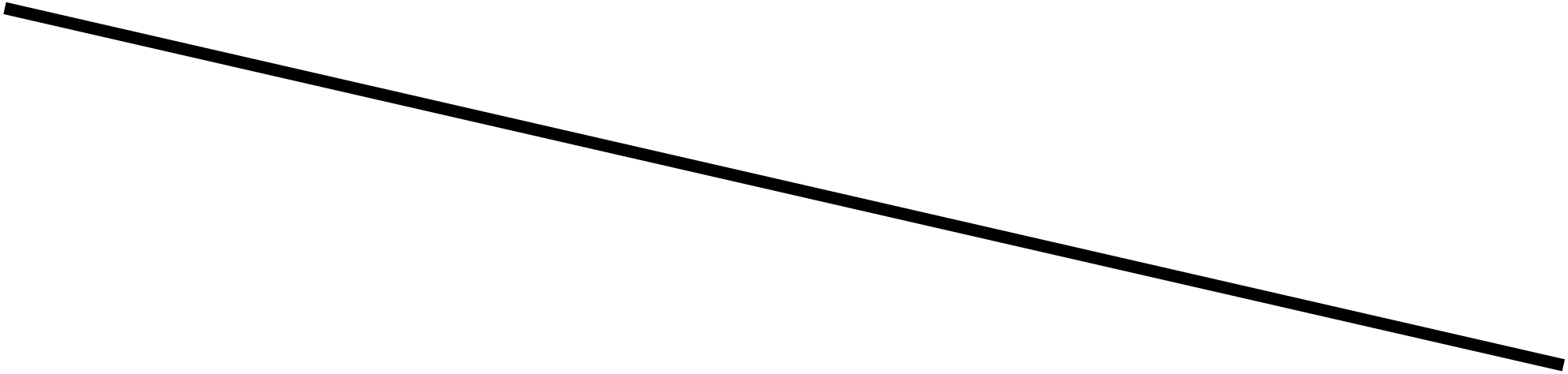
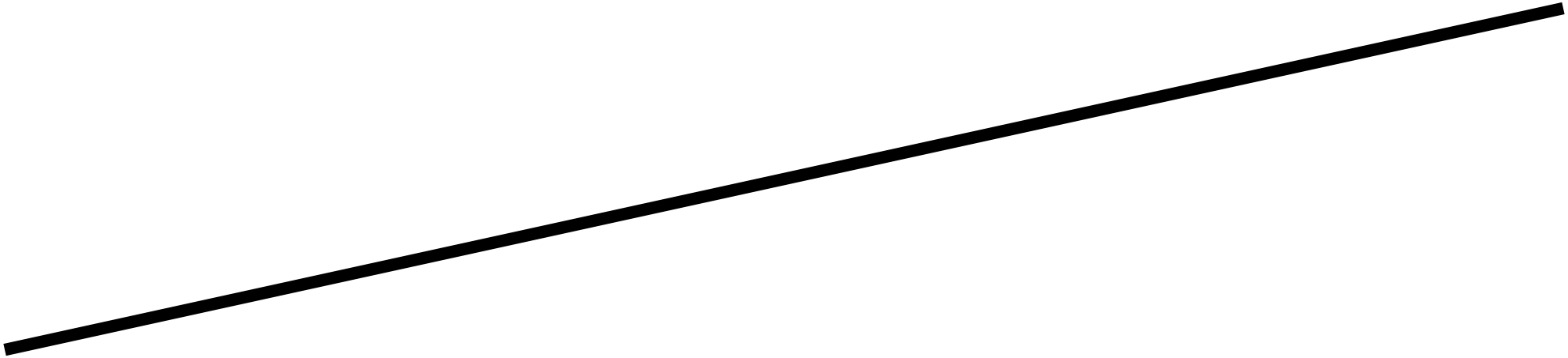
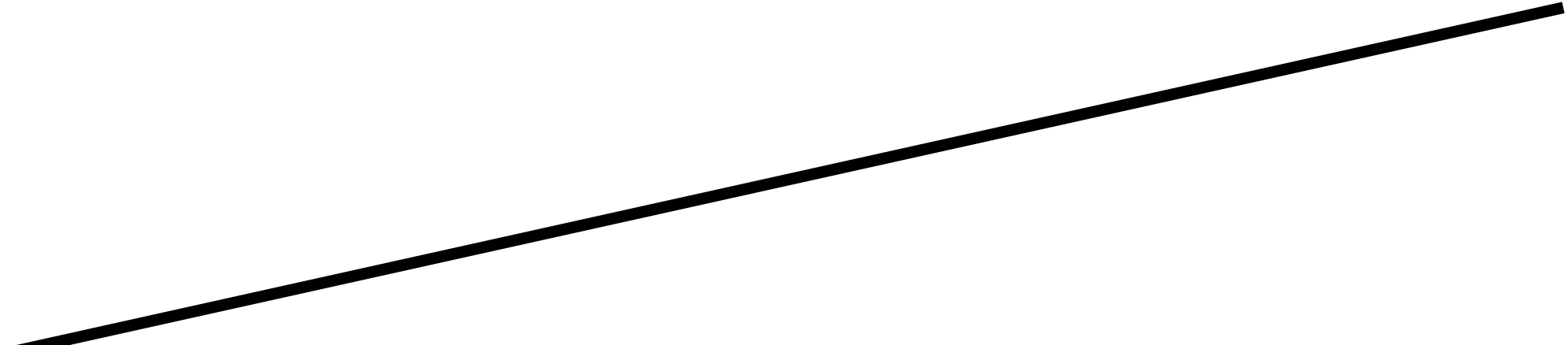
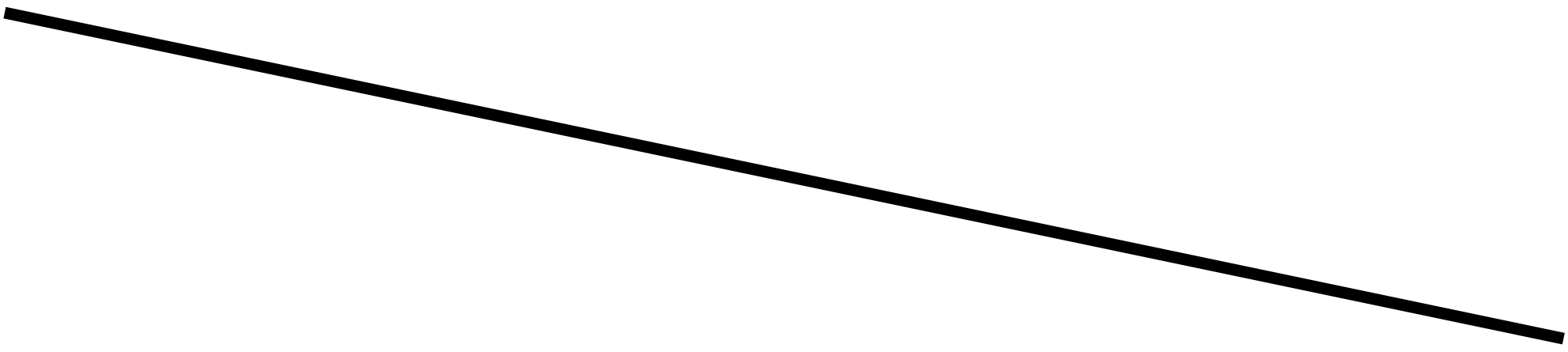
VAEs in practice









$$x \sim p(x)$$

$$x' \sim p_\vartheta(x \mid z)$$

$$z \sim q_\varphi(z \mid x)$$

Decoder

Noise model / data likelihood

Encoder

$$q_\varphi(z \mid x) = \mathcal{N}(z; \mu, \sigma^2 \mathbb{I})$$

$$\mu, \sigma^2 = \mathrm{NN}_\varphi(x)$$

$$p(z) = \mathcal{N}(z; 0, I)$$

Prior

Original image

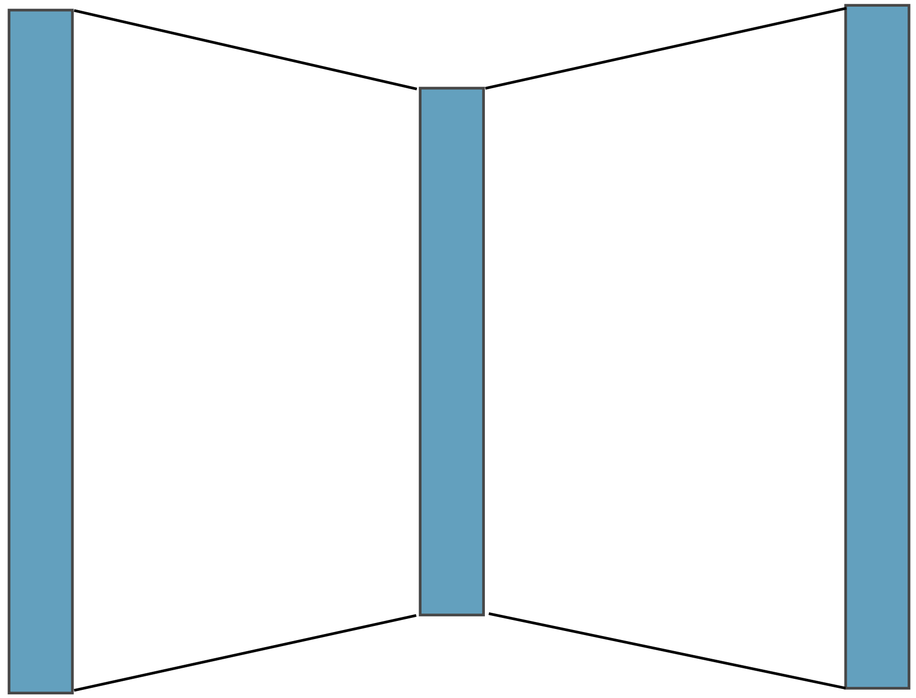
Reconstruction

VAEs in practice

$$p(z) = \mathcal{N}(z; 0, I)$$

Prior

Original image



Reconstruction

$x \sim p(x)$ $\quad$ $z \sim q_\varphi(z \mid x)$ $\quad$ $x' \sim p_\vartheta(x \mid z)$

Encoder

$$q_\varphi(z \mid x) = \mathcal{N}(z; \mu, \sigma^2 \mathbb{I})$$

$$\mu, \sigma^2 = \mathrm{NN}_\varphi(x)$$

Decoder

Noise model / data likelihood

VAEs in practice

$$\text{ELBO} = \left\langle \log p_\vartheta(x \mid z) \right\rangle_{q_\varphi} - D_{\text{KL}}\left(q_\varphi(z \mid x) \,\|\, p(z) \right)$$